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**Volume: 1, 1903**



PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

THE ZOOLOGICAL QUARTERLY.

VOL. I, No. 1.

MAY 15, 1903.

BIRDS AROUND THE FARM.

I. BIRD HOUSES AND NESTING SITES.  
(With eight illustrations by Mrs. H. A. Surface.)

II. THEIR ECONOMIC VALUE, DESTRUCTION AND PRESERVATION.

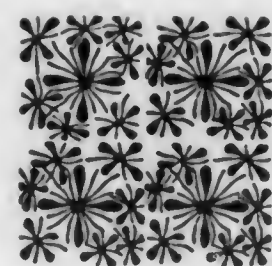
III. BIRD STUDY: ITS EDUCATIONAL VALUE AND METHODS.

BY H. A. SURFACE, M. S., *Economic Zoologist.*

To be Issued Quarterly from the Office of the Economic Zoologist,  
Harrisburg, Pa.

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## I. BIRDS AND HORTICULTURISTS.

Nesting Boxes and Bird Nesting.—How We May Aid the Birds in this  
Most Important Feature of Their Lives.—The First Step Toward  
Establishing Bird Colonies.

By THE ECONOMIC ZOOLOGIST.

Illustrated by MRS. H. A. SURFACE.

Many persons wish birds to colonize around their premises this summer, and there is yet time to do some things to aid in drawing the birds to the desired places and keeping them there. But it must be borne in mind that there is no better prospect of wild birds living abundantly in any one region, of their own accord and under ordinary conditions, than there is of fruits springing up there spontaneously and thriving luxuriously without thought or care on the part of man.

It is now acknowledged that birds are among the greatest friends of the grower of fruits or vegetation; and from the economic standpoint, they represent cash value far beyond previous belief. But to hope for the beneficial effects of their presence without first doing something to make them see that they are provided for and feel at home is to hope in vain.

For certain kinds of our most useful birds there is no better way to provide than to erect bird boxes or houses.

The sooner this is done in the early spring the better it will be, hence it is hoped this article will be found at once timely and practical. New houses or boxes should have time to "weather" or let the newness wear off, before they are to be inspected by the feathered house-hunters. Birds have an appreciation of the appearance of stability and do not like to appropriate to their own use structures that seem too recent or temporary. Of course any structure placed out of doors will last longer if painted, and it is well to give bird houses a good outside coating of paint, but it must have time to dry thoroughly before the time for their occupancy.



Fig. A, represents a house-shaped structure in which many kinds of birds will nest. Yet we would advise the omission of the platform in front, as that is too convenient for English sparrows, and native birds do not care for it. It has but one door and as many windows (with glass well set in with putty) as the person building the house may choose. It is not necessary to make any windows in a bird house, yet one or two will prove acceptable to the birds. The door or passage opening is the main feature of interest to the birds and this should be made with care. In size it should conform to the size of the bird for which the house is built. For wrens and chickadees, it must be an inch and a quarter in diameter, for bluebirds two, and for the purple martins about two and one-half inches. This is in order that the desired occupant of the house may be able to hold it against possible intruders; for it must be borne in mind that the quarrelsome little English sparrow is constantly on the lookout for an opportunity to sink his bill into a little egg, or to drive off birds not of his own kind. There should be but one entrance to each compartment of the house, and if this is the right size for the birds living in it, intruders will not only find themselves at a disadvantage in attempting to fight from the outside, but they will find it impossible to force an entrance through a snug port hole fairly filled with the beak and head of the defender.

Mr. H. Nehrling, in "Our Native Birds of Song and Beauty," says that after actual experiment, it was found that the English sparrow will not nest in boxes that are, like that of figure B, without a peg, floor, or supporting perch just outside the entrance (perch and peg shown in A and G, respectively), while the blue-birds fly in and out readily and seem perfectly at home in such a house, as we have proven by actual test.

It is also commonly said that the English sparrow will never nest in a box or house that swings freely, as does D.

Figure B, represents one of the neatest kinds of bird houses and one that is very acceptable to the birds; it is also quite easily made. It is nothing more than a section of a hollow log or limb with the ends boarded up and an augur hole bored for the entrance. For cheapness, neatness, rustic simplicity, ease of construction, and suitability to many birds it cannot be improved upon. We heartily commend this as one of the most simple devices that man may use as an auxiliary in his efforts to atone for past neglect of his most valuable allies. Figure B also shows a simple device to protect nests, whether on posts or in trees, from the ravages of cats, squirrels, etc. It is recognized that squirrels, especially the red squirrel or chickaree (*Sciurus hudsonicus*), are among the greatest enemies of birds' eggs, but this simple device can be used very effectively on trees or posts in parks, lawns, or other places, without injury to

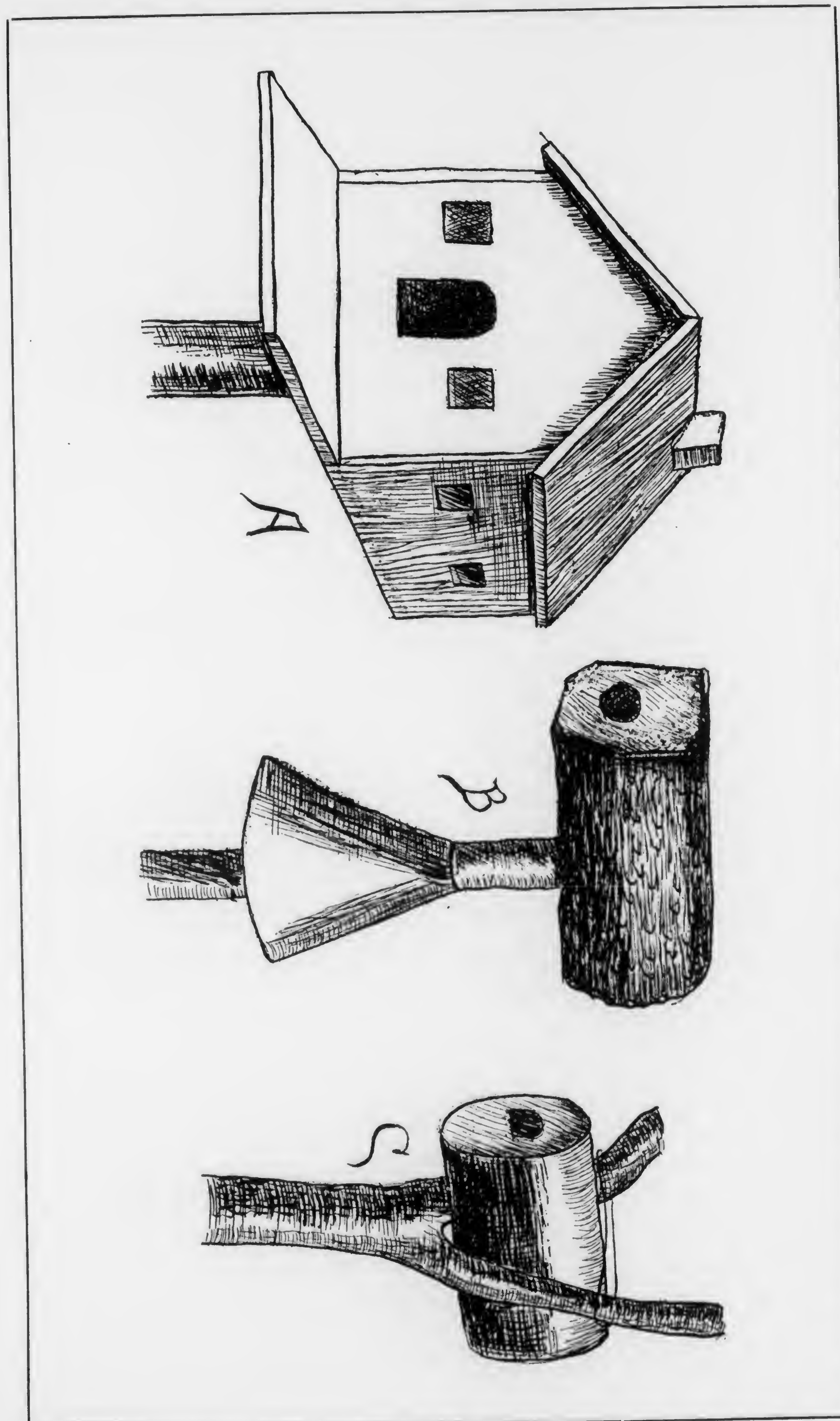


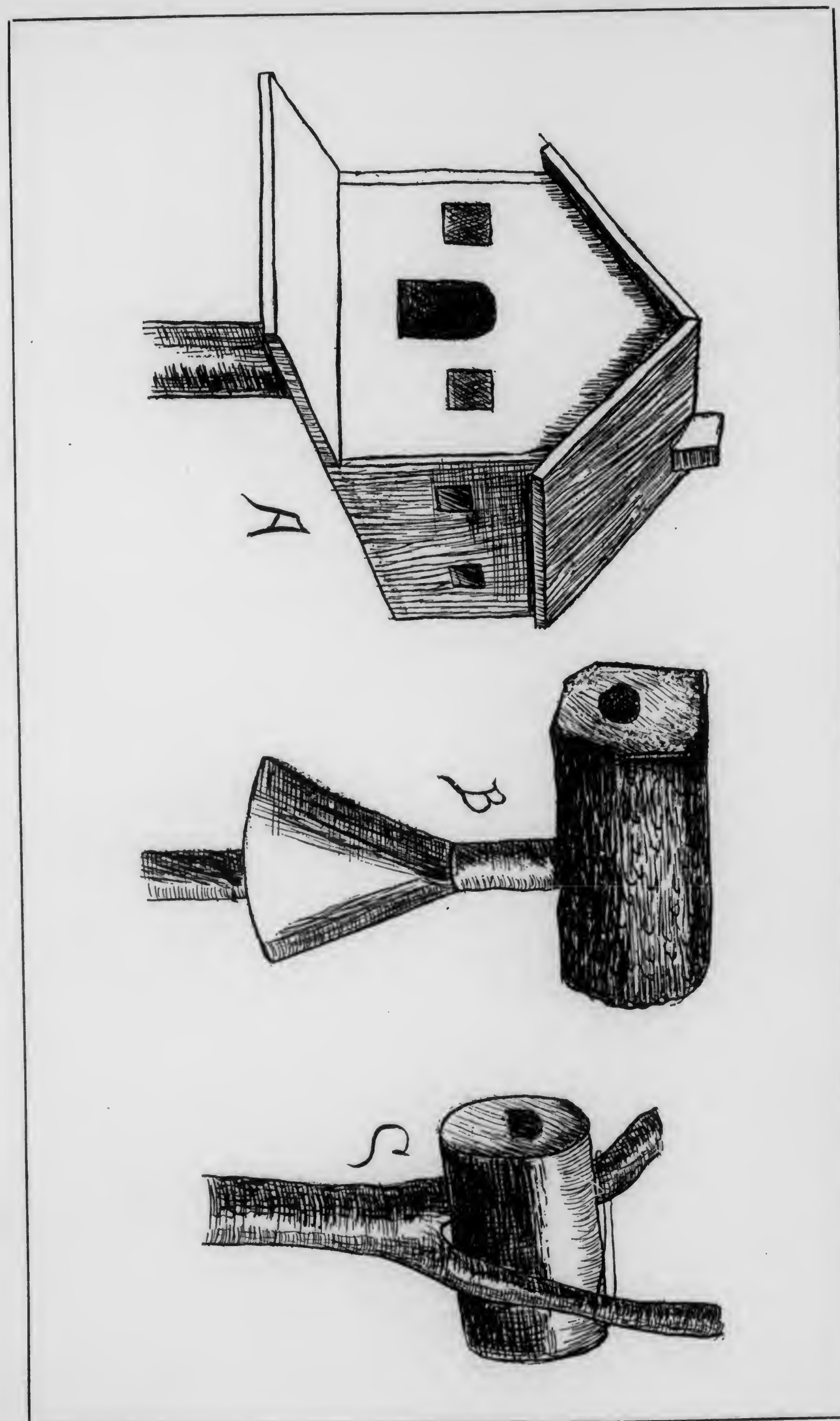


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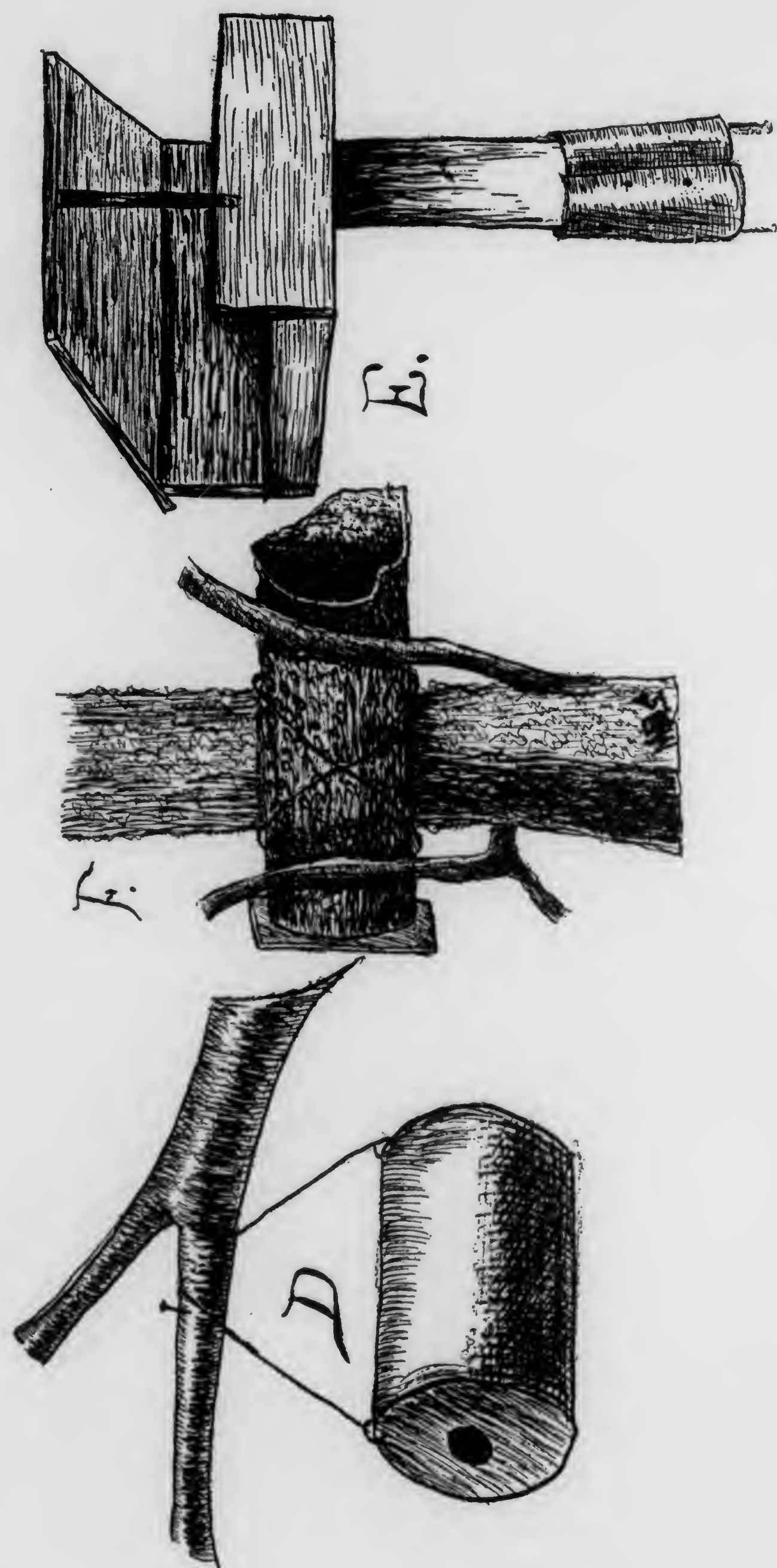
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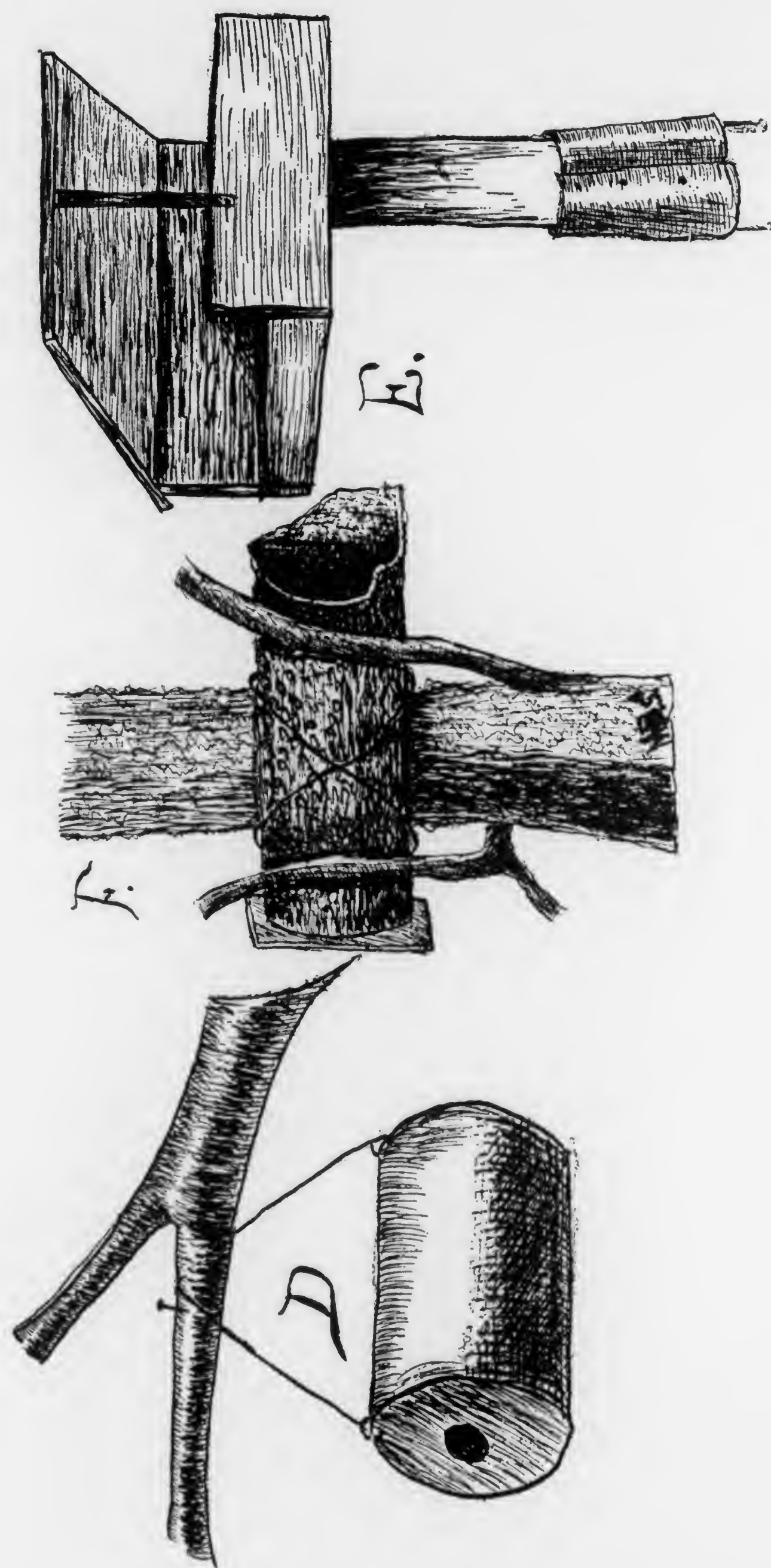
trees, squirrels or birds. It consists merely of an inverted funnel-shaped sheet of tin about a foot across, fastened around the post or tree which contains the nest to be protected. If it is a living tree and one does not choose to drive nails in it, the tin can be fastened effectively by merely tying securely with strong string or wire. In fact the spreading condition of the tin is not necessary, as a band of tin one and one-half or two feet in width lying close to the post or tree will prevent any animal climbing over it, as shown in figure E.

The principal birds that can be induced to nest in houses or boxes are the purple martin, bluebird, chickadee, wren, and titmouse, and certain fly-catchers, besides English sparrows. These are wholly beneficial birds (excepting the last), without one obnoxious feature. It is often said that birds, especially martins and swallows, carry lice to the premises and the vermin infest live stock or even man. However, this is absolutely untrue and unjust. Although it is true that birds are likely to be cruelly infested with very small mites, these will not live upon other kinds of animals or upon man, and we should not give credence to the stories of evil from this source. When it is observed that the birds spend a great deal of time picking and preening themselves it may be inferred that they are infested with these pests, which so sorely inflict our feathered friends only. Then it will be well to sift over the nest a little persian insect powder or buhach, which will not only alleviate the suffering of the birds, but will give them more time to act the useful part of feathered entomologists.

Another valuable feature of the presence of birds is not often considered, but is of great importance. This is their usefulness in driving off enemies of poultry, especially hawks. It would we'll repay every poultry keeper to have a few occupied bird houses on his premises for the sake of the practical service they may thus render. Hawks are very valuable in their place. This is not over the poultry yard, but in the woods and fields, where they may prey upon the numerous small mammals, especially the rodents, such as rats and mice, those wholly obnoxious creatures that "have one obvious part to play, that of turning grass into flesh, in order that carnivorous Goths and Vandals may subsist also, and in their turn proclaim 'All flesh is grass.'" (Coues.)

Figure C. shows how an empty tin can may be utilized to become "some happy creature's home." The end that was cut open has been removed by heating it, and in its place has been nailed a circular board with a hole cut in for a passage way. We have known those very interesting little birds, the house wrens, to nest in a tin can without even the closed end, and were it not for their having to





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protect their home against intruders, such as the English sparrow or jay, there is no reason why an open can should not always be used. For wrens the boxes or cans should be placed only high enough to be out of the way of prowling animals.

A fence corner in a clump of bushes, or the midst of an old brush pile, makes an ideal place for such birds to nest. I have had them rear two broods of young in one season in a chalk box fastened against our porch post, as shown in H.

Of course, most birds, excepting martins and sometimes bluebirds, prefer to nest in places that are slightly concealed, or at most not openly conspicuous. It would be cruel to place a tin house or can on an exposed post where the hot sun would shine down upon it, inflicting absolute torture upon the young and delicate birds as they have to stay in the nests. If the boxes cannot be placed partly in the shade of trees or buildings it would be in most cases a good plan to fasten a board above, more as a protection against the hot sun than against the rain and wind. Of course where a wooden house is used, it does not need other protection.

It will also be more suitable to the birds to have their houses or boxes placed with the door to the east, so the prevailing wind and rain coming from the west will not blow in, and so they can have an opportunity to enjoy the morning sunshine at the entrance to their houses.

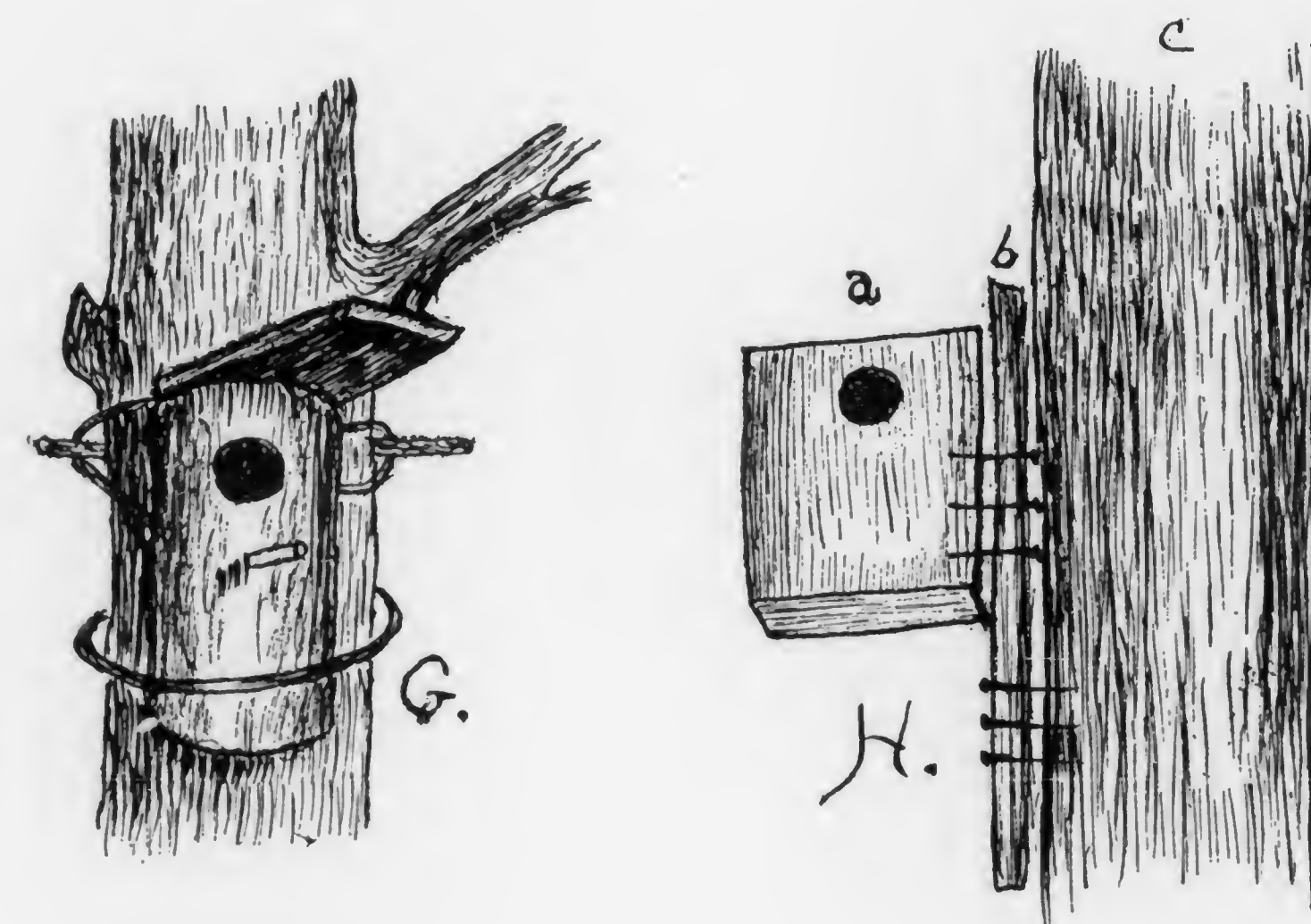
Figure D shows how a box, house or tin can may be supported by a wire from a pole or the branch of a tree. It is said that the English sparrow will not attempt to occupy a nesting place that thus swings free, while our native birds really appear to enjoy it.

It is desirable that one end of all bird houses and nesting boxes be detachable in order to clean them after the brood has departed, so that they will be accepted by the next family of bird tenants. For this purpose, the end of the box may be fastened with a hinge or hooks. Details in these regards are not necessary, because if a person should not have enough ingenuity to construct and care for the boxes according to the needs of the birds, especially after having received a few practical suggestions, he will not have enough tact to properly take other measures necessary in bird colonization.

Some species of birds that will not nest in closed houses or boxes will readily occupy come modification of the open box, shown in Figure E.

This is but a box like a chalk box (for school crayons) with the two ends cut away to near the bottom and a protecting board fastened to slope over one side. Among the species of birds that will nest in these open boxes are the robin, pewee, and phoebe.

Old boxes of small size, or paint kegs, may be very successfully utilized for bird nesting, but new or recently used tobacco boxes or cigar boxes should never be attempted. May the hint suffice.





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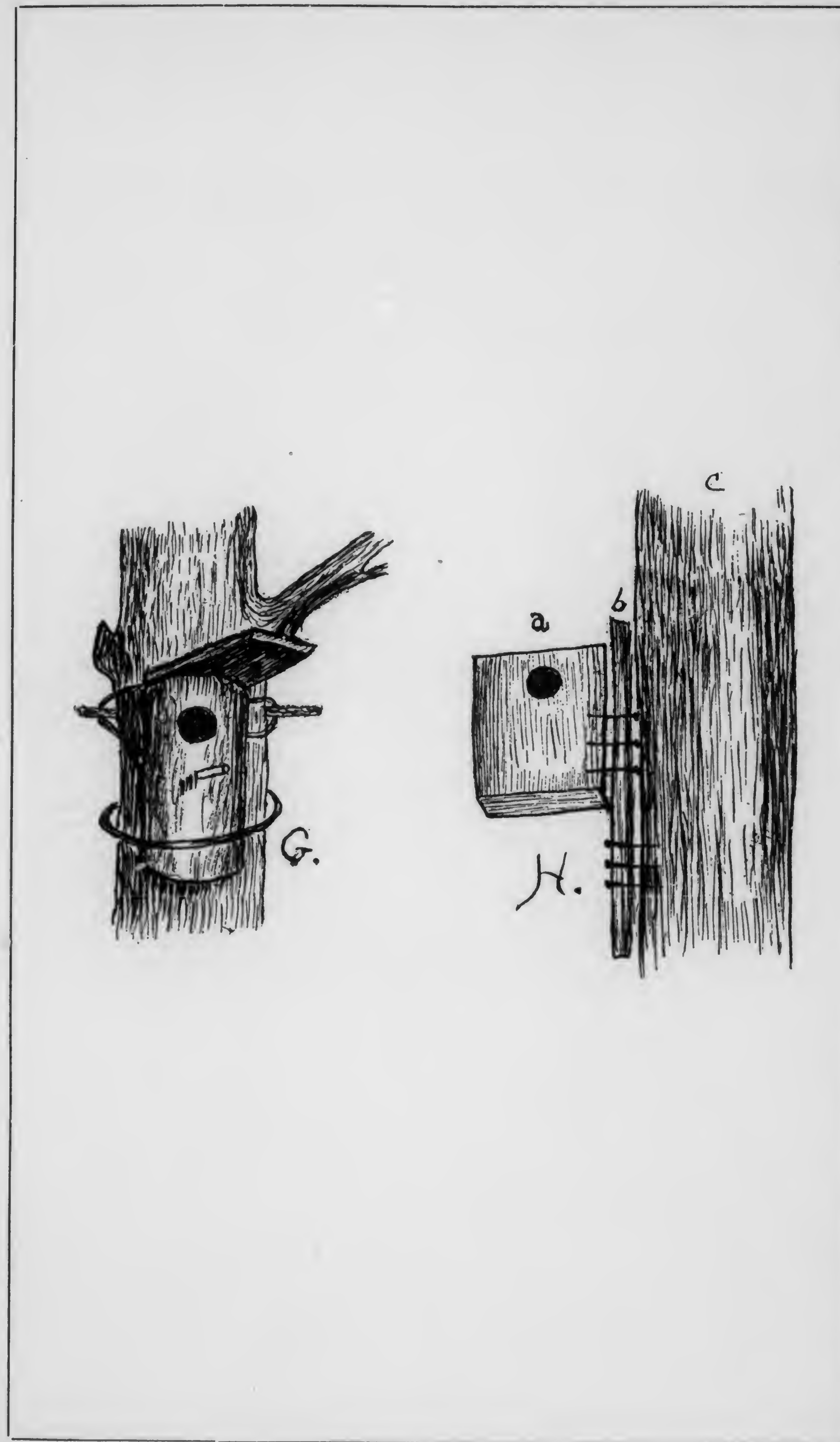
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The elevation above ground at which the house is placed should depend upon the kinds of birds for which it is intended. Martins prefer a house 25 or 30 feet above ground, while bluebirds do not care to live so high. From 10 to 15 feet above ground will suit them best. Chickadees and titmice will also nest at this elevation or lower, while the cunning little wrens prefer to keep still closer to terra firma, and will often nest in low stumps or the hollow trunks of old apple or other trees.

Among the best devices that can be arranged for the home of many birds, including woodpeckers, nuthatches, wrens, chickadees, bluebirds, etc., is an old dead stump with holes in it, set upright in the ground like a post. We know of birds this present year commencing to nest in such a place.

A very great mistake is often made by persons who write for effect rather than for the birds, and are anxious to make their structures for bird colonies attractive to the eye of man regardless of the needs of the birds. This mistake consists in grouping into one artistic (?) piece several bird boxes or nesting places, and what is worse, even advocating placing such compound affairs in shrubbery or trees. Any person qualified to write on this subject should know that with the one exception of the martin, none of our native birds that are likely to nest in boxes or houses are gregarious, and the martins will not accept concealed nesting places where they have to fly out and in among the branches of trees. Owing to the gregarious habits of these birds a house of several compartments is proper, but it should be placed out in an open area where the black-winged sprites can fly, and wheel, and circle and dart, and play, and catch insects with unobstructed freedom, as they, in common with the swallows and swifts, feed while flying. No American birds will consent to occupy apartment houses in partial concealment. This is left solely to the English sparrow, that vagabond that makes itself at home everywhere and is ever ready to utilize and soil anything from the top of the Statue of Liberty to the corner of a pig sty. These are not the birds we need about our premises and for the propagation of which this article is written.

Most of our native and beneficial birds prefer to have at least a small "region" of their own, in which no other birds of the same species nest. Such points should be well considered in constructing and erecting nest conveniences.

After the young are hatched they should never be fed by any person. The parent birds know just what to select and give their young, and we know of cases of innocent little bird lives being sacrificed through the kind but ignorant attentions of mankind. If one really cares to feed the young, the intended food should be placed near the nest where the parent birds can find it and deliver it to their young or refuse it, or eat it themselves, as they find best.



It is important to arrange for lighting and ventilating these houses. There should be holes or cracks on one side large enough to admit some light and air, but so small as to exclude other birds. These ventilating openings should not be at opposite sides, as they would thus permit currents of air to blow over and chill the young birds.

Another important consideration is to place the entrance near the top rather than at the bottom. This is because the nesting material fills the bottom of the house or box, and the birds prefer to enter at the top and hop down to their nests. Figure F shows how a hollow log may be closed at one end and fastened in a tree along a stream for the wood duck, that "vanishing game bird," and most beautiful of all American birds, which nests in such places.

Figure G is reproduced from that beautiful and interesting book, "Our Native Birds of Song and Beauty," by Henry Nehrling, of Wisconsin (Pub. Geo. Brumdee & Co., Milwaukee). It shows how a section of a dead log may be attached to a living tree in order to accommodate certain species of birds that nest in cavities.

Figure H shows how any kind of a box may be firmly attached to a tree, pole, or building. First nail the board (b) to the box (a) as shown by the upper three nails, then by nails through the lower part of the board fasten it to the post or building (e). We have bluebirds this year nesting in such a box.

## II. The Value, Destruction and Preservation of Birds.

(From the manuscript of a book on General Biology, by H. A. Surface, Professor of Zoology, The Pennsylvania State College.)

### The Economic Features of Birds.

(a) Injurious. A few birds destroy poultry, but the goshawk, great horned owl, sharp-shinned hawk, and osprey, are the only species of raptorial birds that are more injurious than beneficial. Many eat fish; others eat fruits and grain, but of the birds around the farm none but the English sparrow justifies suppression. All others more than pay for their slight damage by destroying obnoxious insects, weed seeds, mice, etc.

(b) Beneficial. Birds yield to mankind eggs, feathers, down, and choice flesh food, besides guano—a valuable fertilizer. They are the chief natural factors in suppressing insects and certain weeds, and there are none that do not have some beneficial features. Also, their ethical value and the pleasures given by their songs and presence should not be forgotten. In Nature they perform an important function by scattering seeds.

It is erroneously thought that the Bee Bird, or king-bird, should be exterminated because it eats bees. Careful examinations of scores of stomachs have proven that it eats but few workers. It eats many robber flies, which destroy bees, and it aids in suppressing many other kinds of obnoxious insects. It should be preserved, even in the apiary, for its economic effects. Many other species of birds deserve specific mention, but information concerning them can freely be gained from the publications of the Division of Biology, of the United States Department of Agriculture, Washington, D. C.

\* \* \* \* \*

The Decrease of Birds: From the second annual report of Dr. Wm. T. Hornady, Director of the Bronx (N. Y.) Zoological Park, we learn that the decrease of birds in Pennsylvania during fifteen years has been fifty-one per cent. They are decreasing rapidly, while injurious insects are seriously increasing. One reason for the increase of insects is the decrease of birds. For both their ethical and economic features our native birds should be preserved. The history of the native organisms of America will become the same as that of the European species in their country. Twenty-three kinds of birds, in the British Isles alone, have become exterminated during the past century.

Among the greatest causes of the decrease of birds are the actions of mankind, either directly in destroying them, or indirectly in failing to provide for their preservation.

Some of the steps that can be taken to induce birds to colonize about the premises are the following:

1. Do not shoot them or permit them to be stoned or frightened.
2. Erect nesting boxes. In these, ten or more species may nest.
3. Prohibit unusual noise around the premises during the nesting season, particularly while birds are selecting sites for nests.
4. Provide nesting material for use in constructing nests.
5. Put out trays of water and mud for robins, swallows, etc., to use in building.
6. Erect and preserve old posts, stumps, and logs with holes in them.
7. Suppress prowling cats and dogs.
8. Plant a few extra fruit trees and berry bushes. Give the birds their share of fruits to pay for destroying insects.
9. Plant some of the native fruit-bearing shrubs and trees around fences. These may be service berry, raspberry, blackberry, elderberry, wild cherry, choke cherry, mulberry, haw, grape and hackberry.
10. Permit a secluded corner to grow up as a thicket for shy birds.
11. Feed and water them during times of scarcity of food and water, both in winter and in summer. Give grain in the straw to quail in winter.



12. Mark the spots where nests are built in the field and have the farming implements drawn around them without destroying them.

13. Discourage egg collecting and needless slaughter of birds.

14. Discover and check their natural enemies, which vary with locality.

15. Put a band of tin, a foot or more wide, around a tree or post containing a nest, to keep climbing enemies from eggs and young.

16. Discourage the manufacture, sale, and use of air guns, sling shots, etc.

17. Do not use for ornamentation, wearing or otherwise, the feathers or parts of birds that are killed solely for that purpose.

18. Organize societies, such as chapters of the various State Audubon Societies, for the study and preservation of the native birds.

19. Aid in disseminating knowledge of existing laws, in enforcing them, and in effecting proper new laws for the protection of birds.

20. By personal effort promote the general and specific knowledge of the value of our native birds and the necessity of protecting them.

21. Aid the growth of public opinion on this subject by advocating the observation of bird day in all schools, the introduction of bird studies, and by other means.

### III. Bird Study: Its Educational Value and Methods.

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"How like are men and birds."—*Shakespeare*.

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In selecting subjects for home study and school work the natural interest of pupils should be considered, although this should by no means be the prime feature in determining the subjects to be presented. We believe that the cultural value should be the first consideration. Indeed, the education of the heart is too often neglected in the wild rush to fill the brain as soon as possible. Perhaps no subject is better adapted to develop the moral or humane features of a child's character than the properly conducted study of birds; and there is no other subject in which children naturally take a greater interest.

This fact is being recognized, there is but one step more, and that is to take advantage of its principles by practical applications. There is no better way of doing this than by encouraging pupils to erect bird houses and take other practical steps for the careful protection and study of these interesting creatures.

We think we have never been in a city or village where the "collecting fever" ran as high as in Ithaca, N. Y., yet after having been led to think of the possibility of protecting birds and encouraging

them to nest on their own premises, the boys in the intermediate and grammar grades of the Ithaca public schools have agreed not only to study the birds and keep notes on their various habits and actions, but they immediately took up the work of bird protection and propagation. They became so actively engaged in making bird-houses for the box nesting species that their enthusiasm exceeded all expectation. They took great interest in the anticipation of some of their houses being occupied by feathered tenants. Of course some were doomed to disappointment for a year or two, but the same houses are preserved and offered to feathered home seekers, and as the birds multiply it is doubtless that every house will finally be occupied.

For practice in manual training there is nothing that will awaken the interest and give as satisfactory results as will the construction of bird houses or boxes, as we have seen demonstrated.

The features of definite study and records by the pupils (both boys and girls) are as follows:

#### A. THE ADULT BIRD.

(a) Kind of bird; (b) sex; (c) description; (d) date when first seen; (e) when common (f) time of arrival (day or night); (g) arriving single; paired or in flocks; (h) when mating; (i) song or notes; (j) which (male or female) builds the nest? (k) which feeds the young? (l) how many broods a year? (m) food for adults; (n) favorite localities or haunts; (o) habits (mostly on the ground, trees, bushes, fences, tree trunks or twigs, etc.); (p) when moulting; (q) change of color when moulting; (r) when flocking in the fall; (s) fall song or note; (t) date of departure; (u) time or departure (day or night); (v) enemies of adults; (w) how to overcome enemies; (x) remarks. (Under "remarks" are to be recorded any features of variation in the color, habits, songs, etc., of adults.)

#### B. THE NEST.

(a) Exact location; (b) situation (on ground, tree, fence, house, etc.); (c) height from ground; (d) when commenced; (e) when finished; (f) materials composing outside and middle parts; (g) kind of lining; (h) diameter, inside, outside; (i) was the same nest used last year; (j) variations in kinds of material used in other nests of same kind; (k) highest of same kind from the ground; (l) nearest to ground; (m) largest diameter; outside, inside; (n) smallest diameter; outside, inside; (o) earliest date for this kind building; (p) latest date; (q) various kinds of places in which nests are placed; (r) other variations in nests; (s) when there are two broods per year is the same nest always used; (t) do the same birds return?



## C. THE EGGS.

(a) Date when first was laid; (b) second; (c) third; (d) fourth; (e) fifth; (f) sixth; (g) seventh; (h) eighth, etc.; (i) general color (background); (j) form and color of smaller markings; (k) total number; (l) shape (represented by drawing); (m) earliest date of laying in other nests of this kind; (n) latest date of laying in other nests; (o) greatest number in other sets of same kind; (p) least number in full set; (q) variations in color; (r) in size; (c) does the cuckoo lay in this bird's nest? (t) enemies of bird's eggs; (u) how overcome?

## D. THE YOUNG BIRDS.

(a) Date of commencing incubation; (b) date of first egg hatching; (c) last egg hatching; (d) do both old birds sit on the eggs? (e) how many hatched? (f) variation in size of young birds in same nest; (g) color; (h) location of the down; (i) do both old birds feed them? (j) kinds of food; (k) enemies in the nest; (l) how to prevent enemies; (m) date of first leaving nest; (n) date of last leaving nest; (o) where are they after leaving nest? (p) how long do they remain there? (q) when do they commence to take food for themselves? (r) kinds of food they select; (s) when do the parents no longer feed them? (t) do the young birds migrate with the parents (u) when do they begin to sing? how? (v) do parents teach them to fly?

The above outline is used to record the features of which individual or pair of birds, each nest, set of eggs, or family. When there are others, either of the same species or different, to be recorded, they can simply be numbered and all records for the same individual, nest, clutch, etc., be made under the same number, different birds being given other numbers.

It is not to be expected that any observer will be able to fill all blanks, but every blank filled will really add to our knowledge of birds, and every person can fill some by personal observations.

H. A. S.

## PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

## DIVISION OF ZOOLOGY.

## THE ZOOLOGICAL QUARTERLY BULLETIN,

(Commenced in May as the Zoological Circular.)

VOL. I. No. 2.--Second Edition.

## THE ECONOMIC VALUE

OF

## OUR NATIVE BIRDS.

## I. AN ANALYTIC KEY FOR THE DETERMINATION OF THE FAMILIES OF PENNSYLVANIAN BIRDS.

(With four illustrations by Mrs. H. A. Surface.)

## II. GENERAL DISCUSSION OF OUR NATIVE BIRDS, BY ORDERS AND FAMILIES.

(Sent free upon Application. No. 1, sent upon Request.)

BY H. A. SURFACE, M. S., *Economic Zoologist*.

Issued Quarterly from the Department of Agriculture,  
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## SALUTATION.

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In presenting to the public the second number of the Zoological Quarterly Bulletin, we find it necessary to introduce scientific names and systematic classification for the first time in this series of our publications. This is because these names and this classification are an integral part of the real science of Nature, and we cannot hope to do profound work, even though elementary, without their use. It will be observed that common names are used with the scientific synonyms wherever possible, and explanations of all technical terms are given carefully the first time they are used. The classification is chiefly for those who wish to make a brief study of the science, and desire to do so upon the same kind of a definite and scientific basis as is used by thorough advanced students. With this kind of a beginning one will readily become competent to read and understand the best advanced books on the subject, and will have the proper basis for further and more advanced scientific studies. This is our chief justification in presenting the Analytic Key in the beginning of this treatise. The other reason for this is that in giving a prolonged discussion of any scientific subject we must treat it with the same kind of system and care that should be observed in describing a large library, for example. As in this there are rooms, alcoves, shelves and books, so in Natural History do we have orders, families, genera and species, each being the name of a kind of group of organisms which is composed in turn of the lower respective groups. For example, the Order Raptores is a great group to which is given the common name of the Birds of Prey, including the four families of the Cathartidæ or Vultures, the Falconidæ or the Hawks, etc., the Bubonidæ, or the Owls, and the Strigidæ, or the Barn Owls. Again, the Family Falconidæ or Hawks is divided into Genera or smaller groups, such as *Elanoides* or the Kite, *Falco* or the Falcons, etc. *Falco*, in turn, as a genus or small group, contains species or kinds, such as *Falco sparverius* or the Sparrow Hawk, *Falco columbarius* or the Pigeon Hawk, *Falco mexicanus*, or the Prairie Falcon, etc. The first word in each of these scientific names is called the name of the genus, corresponding to our surnames or family names, and the second name is called the name of the species, which corresponds to our given names. The two names together, in proper respective order, compose the scien-

tific name of the organism, according to what is called the Binomial System of Nomenclature, which was introduced by Linnaeus in 1758, and is continued to-day, with but slight modification, in applying the scientific names to any and all organisms, including all kinds of plants and animals, whether modern or fossilized.

The great beauty of scientific names is that any one kind of an object has only the one scientific name and is known by that all over the world, by scientists of all nationalities, and there is no possibility of mistake in treating it in lectures or writings. Common names, however, may be applied promiscuously and often indefinitely. For example, our Eastern Quail is known to all scientists by the definite scientific name of *Collinus virginianus* while it is called in some parts of the country the "Bob-white," in others the "Partridge," and in others the "Quail," and what is more confusing is the fact that the name "Partridge" is the common term for this kind of bird in the South, and also the common name of another kind of bird (the Ruffed Grouse) in the North.

Fortunately, nearly all our birds have common names, and these will be given instead of the scientific names in order to be better understood by the commonplace and reliable citizens for whom these Bulletins are expressly prepared. We hesitate to issue such a publication as this because it is really difficult to be scientific and accurate without using scientific terms. If we use them we are not understood, and if we do not do so our many critical scientific acquaintances are ready to charge us with inaccuracy in the attempted plain statement of a scientific fact.

Readers may decide for themselves, after perusing the following pages, as to the class of persons for whom we have written.

## OUR SUBJECT.

We had not intended to select the subject of birds for this number of the Zoological Bulletin, as it is our intention to treat a wide range of zoological topics in the Quarterly, but the great numbers of requests for the first number on "Birds Around the Farm," and the manifest interest in this subject, prompted us to commence a series of publications devoted to a general study of the Economic Value of Our Native Birds. We shall continue this until all Orders and Families of birds treated are at least briefly in their economic aspects or relations to man, although we wish to say now that it is not our intention to make an uninterrupted series of this treatment in this Bulletin. In fact, in the next issue we may think it ad-



visible to discuss some subject that may be especially timely. For example, during the winter we hope to issue a Bulletin upon the unusual subject of "The Tracks of Animals in Snow." When the proper time comes we shall return to the subject of the usefulness of our native birds.

We would again call attention to the fact that the publications of this Department and Division are free of charge, and we shall be glad to send them to anyone upon request, but none will be sent wholesale and broadcast over the State to persons who do not care enough for them to ask for them. A postal card will insure your name and the names of several of your friends on your mailing lists for the entire year. Teachers who wish several copies for their schools may obtain them free of charge by writing for them. Those who write first are sure to be served before the edition is exhausted. There is no objection to a person requesting all our publications. They will cheerfully be sent. We only ask to be informed that they are desired.

Very respectfully,

H. A. SURFACE,  
Economic Zoologist.

All persons should know the law. It is the particular duty of parents and teachers to teach it to young people, and all should aid in its enforcement, especially in creating a strong public sentiment in favor of it.

All should know that all birds are protected by law at all times, excepting (1) the Game Birds, which may be killed only during the legal open season, and (2) certain species of questionable value, as the English Sparrow, the Kingfisher, Green Heron, Night Heron, Great Horned Owl, Barred Owl, Cooper's Hawk, and Sharp-shinned Hawk.

However, by special provision of the law, wherever and whenever a bird or other creature is known to destroy property, it may be killed for the purpose of protecting the property.

It is against the law to trap or keep in captivity any native bird, to rob nests, to stone or shoot at the birds, and to use (in city or borough) air guns and other instruments projecting leaden missiles. A valued service will be rendered the State and the birds it should protect by reporting all violations of law at once to Dr. J. Kalbfus, Secretary State Game Commission, Harrisburg, Pa.

## THE ECONOMIC VALUE OF OUR NATIVE BIRDS.\*

### I. Analytic Key for the Determination of Families of Pennsylvanian Birds.

Prepared by H. A. Surface, Economic Zoologist.

- A. Feet with all four toes connected by a continuous web; ORDER III—STEGANOPODES. TOTIPOLMATE BIRDS. FAMILY 5.—Phalacrocoracidae. Cormorants.
- AA. Feet with all four toes not connected by a web.
- B. Feet with the front toes (only) full-webbed, or toes with lobes of webbing at sides, and then claw flat and nail-like.
- C. Bill without teeth-like plates set on edge in a row along the sides; not broad at tip, but sharp-pointed.
- D. Legs far back, at "dump." ORD I.—PYGOPODES. THE DIVING BIRDS.
- e. No tail feathers. FAM. 1.—Podicipidae. The Grebes.
- ee. Tail feathers present.
- f. Toes, four. FAM. 2.—Urinatoridae. Loons.
- ff. Toes, three. FAM. 3.—Alcidae. Auks, Murres, Etc.
- DD. Legs not far back on body. ORD II.—LONGIPENNES. LONG-WINGED SWIMMERS. FAM. 4.—Laridae. Gulls and Terns.
- CC. Bill with teeth-like plates along the sides, as in a duck, broad (depressed). ORD. IV.—ANSERES. "PLATE-TOOTHED" SWIMMERS. FAM. 6.—Anatidae. Ducks, Geese and Swans.
- BB. Front toes not full-webbed.
- F. Legs long; tibia (Fig. 9, A.) naked below; waders.
- G. Hind toes well developed and level with the others. Middle claw with teeth on one side. ORD. V.—HERODIONES HERONS, STORKS, ETC. FAM. 7.—Ardeidae. Herons, Bitterns, Etc.
- GG. Hind toe (if present) small and above level of others. Middle claw without teeth.
- H. Hind toe never absent, but little above level of others. Bill never sensitive; wings short and rounded. ORD. VI.—PALUDICOLAE. CRANES, RAILS, ETC. FAM. 8.—Rallidae. Rails, Gallinules and Coots.
- HH. Hind toe (when present) quite above level of others. Bill sometimes very sensitive, soft and flexible toward the tip. ORD. VII.—LIMICOLE. THE SHORE-BIRDS.
- i. Tarsus (i. e., portion of leg just above foot) scutellate (with regular broad plates, in vertical series) in front (Fig. 9, B.). Bill slender, flexible, sensitive, with a blunt tip. FAM. 9.—Scolopocidae. Snipes and Sandpipes.

\*Much of the material of this Bulletin is taken from American Gardening (N. Y.), in which it was originally published by the Economic Zoologist when he was Ornithological Editor for that publication. It is compiled from all possible reliable sources, including many personal notes of the author.



- ll. Tarsus reitculate (with regular net-like markings) in front, (Fig. 9, A.). Bill with sharp tip, not soft and sensitive. FAM. 10.—Charadriidæ. Plovers.
- FF. Legs not elongate; tibia (i. e. "the drum stick") full feathered; not waders.
- J. Bill strongly hooked and with a fleshy cere (Fig. 9, D.) at base. ORD. VIII.—RAPTORES. THE BIRDS OF PREY.
- k. Head naked, hind toe with a short dull claw. FAM. 11.—Cathartidæ. Vultures.
- kk. Head feathered, and hind toe long and sharp.
- l. Eyes directed sidewise and not surrounded by a disk of radiating feathers. FAM. 12.—Falconidæ. Kites, Hawks, Eagles; etc.
- ll. Eyes directed forward, and surrounded by a disk of radiating feathers.
- m. Middle claw with comb on inner edge. FAM. 13.—Strigidæ. Barn Owls.
- mm. Middle claw with no comb. FAM. 14.—Bubonidæ. Owls.
- JJ. Bill without both strong hook and cere at the same time.
- L. Hind toe short, slightly elevated; the front toes more or less connected at base by a small webbing. ORD. IX.—GALLINÆ. THE "CHICKEN-LIKE" BIRDS. FAM. 15.—Tetraonidæ. Grouse and Quail.
- LL. Hind toe not short and elevated.
- M. Bill cored but not strong and hooked. (Fig. 9, D.). ORD. X.—COLUMBÆ. PIGEONS AND DOVES. FAM. 16.—Columbidæ. Pigeons and Doves.
- MM. Bill not cored.
- N. Hind claw not quite as long as the longest of the anterior (front) claws.
- O. Toes, two in front and two behind; or the outer and middle toes united.
- P. Tail feathers soft. ORD. XI.—COCCYGES. CUCKOO-LIKE BIRDS.
- q. Toes, two in front, two behind. FAM. 17.—Cuculidæ. Cuckoos.
- qq. Toes, three in front, one behind, outer and middle grown together half their length. FAM. 18.—Alcedinidæ. Kingfishers.
- PP. Tail feathers rigid, pointed at tips. ORD. XII.—PICI. WOODPECKERS. FAM. 19.—Picidæ. Woodpeckers.
- OO. Toes three in front and one behind, and outer and middle never united. Mouth with wide gape (opening) and short bill; or bill very long and slender. ORD. XIII.—MACROCHIRES. GOATSUCKERS, SWIFTS AND HUMMING BIRDS.
- r. Bill short and broad at base.
- s. Middle claw toothed. FAM. 20.—Caprimulgidæ. Goatsuckers, Etc.
- ss. Middle claw not toothed. FAM. 21.—Micropodidæ. Swifts.
- rr. Bill very long and slender. FAM. 22.—Trochilidæ. Humming Birds.
- NN. Hind claw as long or longer than the middle front claw. Toes always three in front, one behind. ORD. XIV.—PASSERES. PERCHING BIRDS.
- t. Tarsus with its hinder edge rounded.
- u. Bill with a hook at tip and long bristles at base. Hind claw curved and not extra long. FAM. 23.—Tyrannidæ. Flycatchers.
- uu. Hind claw straight and very long. FAM. 24.—Alaudidæ. Larks.
- tt. Tarsus with its hinder edge sharply compressed.
- v. Apparently but nine primaries (i. e., the long feathers on the "outer joint" of the wing) present; (the first minute and displaced); the first that is developed is about as long as the next; bill not hooked at tip.
- w. Bill with but ordinarily wide gape.
- x. Bill strong, with an angle in the cutting edge near the base of the upper mandible, with the corners of the mouth drawn downward (= conirostral).
- y. Bill rather long, sharp pointed, no notch at tip nor bristles at base. FAM. 25.—Icteridæ. Orioles and Blackbirds.

- yy. Bill short, often notched at tip, and usually with bristles at base. FAM. 26.—Fringillidæ. Finches, Sparrows, Etc.
- xx. Bill not "conirostral" (not as in "X"); no downward angle of the mouth near the base of the upper bill.
- z. Bill strong, upper mandible (bill) slightly toothed near its middle. Plumage mostly red. FAM. 27.—Tanagridæ. Tanagers.
- zz. Bill rather slender, not strongly conical.
- &. Hind claw much shorter than its toe. FAM. 28.—Mniotiltidæ. Warblers.
- &&. Hind claw as long as its toe. FAM. 29.—Motacillidæ. Pipits.
- ww. Bill with very wide gape. Wings pointed. FAM. 30.—Hirundinidæ. Swallows.
- vv. Primaries evidently ten, the first developed, but short, rarely half the length of the next; or tip of bill hooked.
- a. Tarsus distinctly covered with regular scales in front, i. e., scutellate (Fig. 9, B.).
- b. Tarsus short; bill short, depressed; head crested; tail tipped with yellow. FAM. 31.—Ampelidæ. Waxwings.
- bb. Tarsus longer than middle toe and claw; or other characters differing from above (b).
- c. Bill both strongly hooked and toothed. FAM. 32.—Laniidæ. Shrikes.
- cc. Bill without both strong hook and tooth.
- d. Bill slightly hooked at tip. FAM. 33.—Vireonidæ. Vireos.
- dd. Bill not hooked at tip.
- e. Tail feathers stiff, pointed. Bill long, decurved. FAM. 34.—Certhiidæ. Creepers.
- ee. Tail feathers soft and rounded at tip.
- f. Nasal feathers directed forward, usually covering the nostrils.
- g. Birds of medium or large size. Wing more than four inches long. FAM. 35.—Corvidæ. Crows and Jays.
- gg. Birds of small size. Wing less than four inches long.
- h. Bill not notched. FAM. 36.—Paridæ. Titmice and Nuthatches.
- hh. Bill notched toward the tip, very slender. FAM. 37.—Sylviidæ. Kinglets.
- ff. Nasal feathers erect or directed backward, not covering nostrils; bill rather slender, the upper side convex. FAM. 38.—Troglodytidæ. Wrens and Mocking Birds.
- aa. Tarsus "booted" (i. e., smooth in front, without distinct scales or cross lines, except near the base (Fig. 9, C.); bristles present at base of bill.
- i. Birds of small size; wing less than three inches long; young unspotted. FAM. 37.—Sylviidæ. Kinglets and Gnat-catchers.
- ii. Birds of medium size; wing more than three inches long; young spotted. FAM. 39.—Turdidæ. Thrushes.

The above "Key" is intended to be useful in giving readers a "bird's eye view" of the classification that includes nearly all American birds. It is unfortunate that in identifying a bird by this "Key" only a specimen in the hand can be used, but many birds are found dead, and these can be utilized in a scientific examination. No one should kill birds for this purpose. It is illegal, even for collecting, unless done by obtaining a properly issued license.

An effort has been made to keep the "Key" free from scientific



terms, but to a certain limit this is impossible. It is just as though one should attempt to take from a machine all the parts that a person who is not a mechanic would not understand.

The Class of Birds or Aves, is divided into large groups called Orders. These Orders are designated in the "Key" by Roman numerals. They are in turn divided into smaller divisions called Families, here numbered with Arabic numerals. This is slightly different from botanical classification, in which the terms "order" and "family" are used for the same group, as equivalents.

We have designated the steps to Orders by capitals, and from Orders to Families by lower case letters. In using the "Key" to find the name of the Family to which a specimen in hand belongs it must be understood that it goes to one or the other of two roads or divisions. It is either "A" or "AA," then if it goes to "AA" it belongs to "B" or "BB;" if to the former it must come either to "C" or "CC," but if to the latter ("BB") it belongs under "F" or "FF." For example, suppose we have in hand the specimen we once found dead, and preserved it. We examine it and find that all the toes are not connected by a web, so it goes to "AA." In fact, the front toes are not full webbed, so it goes to "BB;" and as the legs are not especially long and the tibia (figure 9, A) is fully covered with feathers below, we know it is not a wader, and it consequently belongs under "FF." The bill does not have both a strong hook and cere (figure 9, D), so it goes to "JJ," and as it does not have a short and elevated hind toe it goes to "LL." The bill has no cere, so it belongs to "MM," and as the longest claw is in front it goes to "N." The toes are "two in front and two behind," so it belongs under "O," and as the tail feathers are stiff and pointed at the tips it goes to "PP." Now as we can run it down no further it must belong to "Order XII. PICI. WOODPECKERS." As there is only one American Family in this order, it belongs to the Family Picidae or Woodpeckers.

It must be remembered that in every case throughout the "Key," a name belongs with the line before it rather than to the one following it.

As the structure, habits, and general economic value is about the same for different kinds of birds belonging to the same Family, it is our intention to take up in the Zoological Quarterly Bulletin a discussion of the practical and interesting features of the representatives of the various Families here named. For that reason this copy should be saved. It may be needed for future reference, as other Bulletins will not be as technical. This is designed to serve as the scientific basis of the definite practical series of articles we have outlined for future Bulletins.

H. A. S.

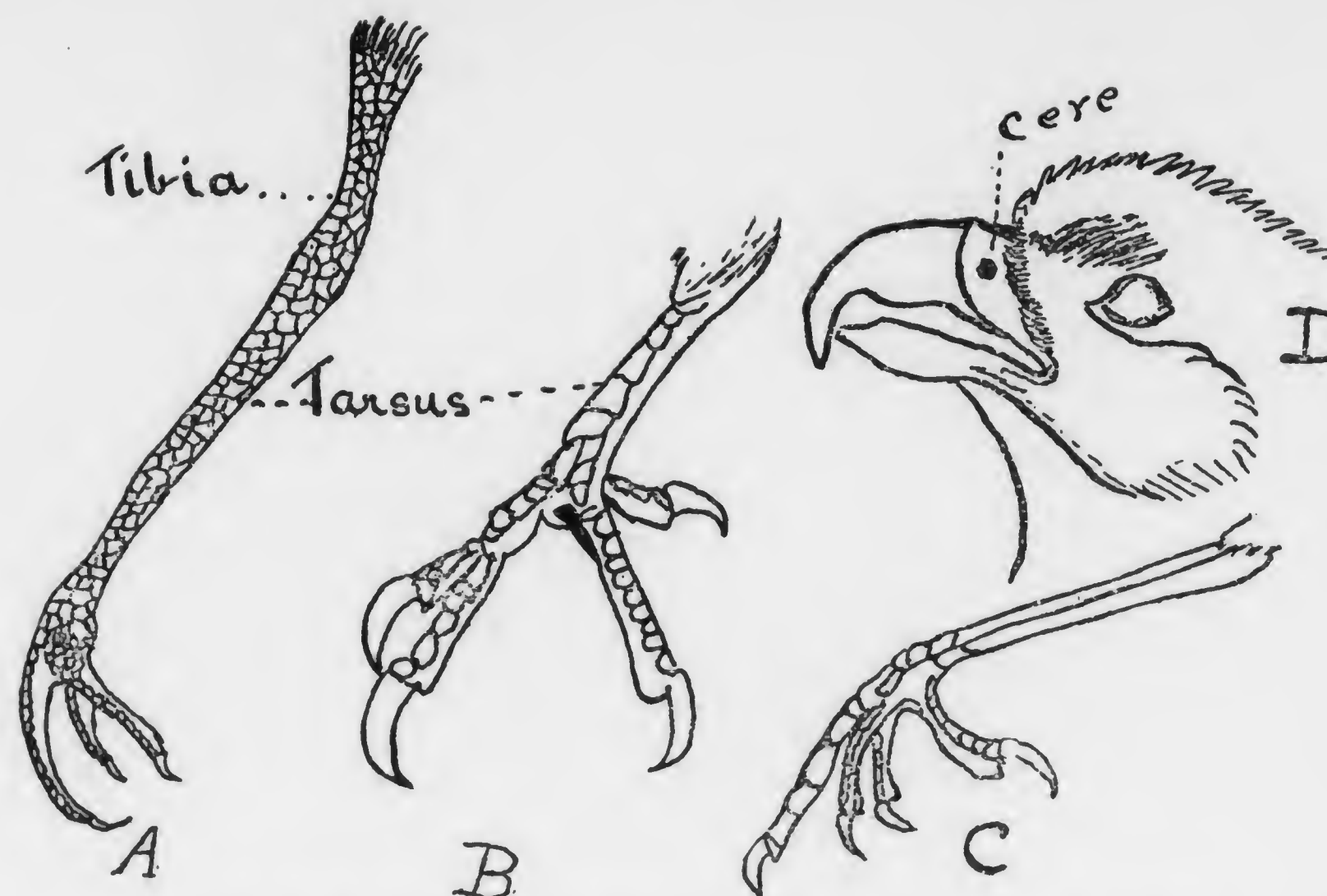


FIG. 9.—SOME BIRD CHARACTERS.—Pen Sketches by Mrs. H. A. Surface.

A.—The Leg of a Wader, showing the Unfeathered End of the Tibia and a Reticulate Tarsus.  
B.—Part of the Leg of a Woodpecker, to show a Scutellate Tarsus.  
C.—Part of the Leg of a Bluebird, to show a Booted Tarsus.  
D.—The Bill of a Hawk, showing a Cere.

## II. GENERAL DISCUSSION OF OUR NATIVE BIRDS, BY ORDERS AND FAMILIES.

It will be of some interest and profit briefly to review each family of American birds, calling attention to the structural peculiarities and economic value of the birds composing these families. It will be of interest and value to our readers to have placed before them a condensed account of all of our native birds. This must consequently contain notes on non-economic as well as economic species, but we feel justified in calling attention to points that may not be of direct value to the horticulturist, yet may add to his knowledge and pleasure. For the sake of definite system we here follow that approved by the American Ornithologists' Union. In this classification the series passes in general from low to high, or from generalized to specialized forms; thus the aquatic birds, particularly the diving birds, in many regards, stand at the foot of the list of our avian fauna; while the song birds or perching birds stand at the top of the list and represent those that have apparently reached the climax of present avian development.



## ORDER I. PYGOPODES OR DIVERS.

The lowest order of living birds is Pygopodes, or the true divers. All the birds of this order have the legs placed far back on the body. This enables their feet to act as stern propellers in driving them through the water, but while nature gives them this advantage for aquatic life the inconvenience for terrestrial life is very great. In consequence of the posterior insertion of the leg, these birds find it necessary when on land to sit upright, and they walk with a waddling movement, very awkwardly and apparently with great difficulty. They are generally seen on the water, where they are decidedly at home, either above or beneath the waves. They are the most perfect divers, using their wings while under water and literally flying through it while in pursuit of fish, aquatic insects or other creatures. The wings are generally short and small in proportion to the size of the body, and not adapted for long flight. Their eggs are sometimes laid on floating material on the water. Some nest on rocky shores of the ocean and sit upright, incubating their single egg by holding it between their legs. As with many other animals that live mostly upon fish, their flesh is not considered good food, yet they are eaten by persons who cannot get better food, and it is said by those who have had experience that if the oil gland at the base of the tail be removed before cooking, the flesh becomes much more palatable. These are the great egg birds which have attracted ship loads of eggers to Labrador and other rocky coasts for the sole purpose of collecting their eggs for market. Their numbers, however, are now greatly diminished and their economic value greatly lessened. The skins of the breasts of these birds when sewed together furnish the inhabitants of the colder regions with warm clothing. It is to this order of birds that the Great Auk belongs—that famous bird whose wings were too feeble for flight and which consequently became extinct during the past century. The order is composed of three families, the Podicipidæ or Grebes and Divers, the Urinatoridæ or Loons, and the Alcidæ or Auks, Murres, etc. The first of these families contains the fresh water Divers; the Loons are either fresh water or marine in their habits, the members of the last family are all marine, but some may occasionally be found on fresh water. The most serious charge that can be made against the birds of this order is the destruction of large numbers of small fish for their food. We have found ten or twelve small fish in the stomach of one Murre or Diver, packed together like sardines in a box, and showing how very destructive such birds may be. The Loon is also one of the greatest destroyers of fishes, although very graceful and interesting.

Owing to their very small wings, these birds can not maintain a long flight, especially against a strong wind. This is why they are often blown inland from the coast regions, especially during the winter when strong winds prevail from the East or Northeast. We have found them starving on the smooth snow, whither they had been carried and whence they could not take wing. Aloon thus captured last winter in Centre county, Pa., could not walk, but pushed itself along over the snow on its breast, using both feet at once, as does the frog in the act of swimming.

## ORDER II. LONGIPENNES. The LONG-WINGED SWIMMERS.

The next order, Longipennes, or long-winged swimmers, includes two families, the Jaegers and Gulls. The Jaegers are marine and live by robbing Terns and Gulls. They are often found far out at sea. The family Laridæ, containing the Gulls and Terns, live during the winter months on fresh water lakes, but generally go to the seashore during the summer to breed. They have powerful flight and keen vision, and feed chiefly on fishes and other animal material. They are protected in most coast towns because they are valuable scavengers. The sexes are colored alike, but there is great variety of coloration due to age, the young being generally darker. Their eggs are often gathered for food.

## ORDER III. STEGANOPODES. THE TOTIPALMATE SWIMMERS.

The next order contains the family of Cormorants and that of the Pelicans. These birds are the only ones that have the hind toe fully webbed or connected with the front. They are ready divers, swimmers and flyers, and appear equally at home under the water where they use their wings freely in pursuit of fish. They are occasionally found inland, but are very numerous along the seashore where the Cormorants are called "Shags." These with the Divers, Gulls and Terns comprise the chief guano forming birds and as pro-



ducers of this valuable fertilizer deserve our recognition. The flesh of none of these birds is considered edible. Pelicans are especially voracious, devouring large numbers of fishes. The writer has taken seven kinds of fishes from the stomach of one Pelican. In it the pectoral spines of a Cat Fish were driven entirely through the thick fleshy stomach and into the flesh of the body itself. The Pelicans have very large pouches under their throats, capable of holding as much as two quarts, in which it is said food and water are conveyed to their young.

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#### ORDER IV. ANSERES. THE DUCKS, GEESE, AND SWANS.

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The Order Anseres, which contains the single family Anatidæ, or the Ducks, Geese and Swans is the most important order that includes swimming birds. It contains nearly all of the aquatic game birds and domesticated birds. They are valued for their flesh as food, for their eggs, and for their feathers. They are mostly vegetable feeders and are generally not regarded as obnoxious or injurious from an economic standpoint. It is true that in some parts of the West, wild Geese and Ducks are so numerous and destructive to grain as to make it necessary to employ riflemen to drive them off the fields. The writer has seen this done in the Sacramento and San Jacquin Valleys in California. The distinguishing and easily recognized difference between Ducks and Geese, is that the former have the tarsus scutellate in front and in the latter it is reticulate. (See Fig. 9, A and B). We have known a flock of domesticated Geese to entirely rid a dooryard of plantain weeds in one season.

The Mergansers, or "Fish Ducks" belong here. They have narrow saw-toothed bills which enable them to catch and hold securely small fish which form their principal article of diet. The Mergansers and some of the Sea Ducks are the only members of this family whose flesh is not edible. This is because such a large percentage of their food is fish.

The Sea Ducks may be distinguished by the presence of a broad web or lobe on the hind toe. They live mostly along the sea and salt marshes, but not exclusively so. They take their food by diving, sometimes to considerable depth. The River Ducks are all edible. They do not have the broad membrane or web on the hind toe, and do not generally dive for their food, which is mostly vegetation.

However, we have found the stomach of a Pintail filled with mollusks—small swamp-inhabiting snails. The Mallard is the ancestor or primitive type of almost all of our domesticated varieties of ducks.

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#### ORDER HERODIONES. HERONS, STORKS, ETC.

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In discussing the important families of American birds, the Herons are the next to demand attention. While there are several families in the order Herodiones, the family Ardeidæ, or the Herons and Bitterns, is the only one that is important in Pennsylvania. Some members of this family (Ardeidæ) are generally well known in all parts of the country, yet but few persons know much of their habits and value.

Hérons have very long necks and legs, with the greater portion of the legs unfeathered. One singular fact is that each member of this family has a set of comb-like teeth on the inside of its middle claw only. This is said to be used in cleaning the grooves of its long bill should they become filled with mud when striking at its prey. They have very short tails, but this is compensated by the long legs rigidly extended straight behind in flying. Some authors have made a mistake in saying that the legs dangle and the neck is extended to its full length while the bird flies. Not only are the legs extended but the neck is curved closely on itself in a compound curve like the letter S.

With these birds the sexes are generally colored alike, but there is great variation due to age and season. These birds generally live along streams and feed mostly upon fishes, but there are some important deviations from this diet. The great Blue Heron is the largest and best known member of the family. In California we have often seen this bird stand out in the open field by the hole of the pouched gopher (*Thomomys*), and remain as quiet as a statue until the occupant of the hole attempted to come above ground. With one powerful and sudden stroke the bird would deal the rodent a fatal blow and after making sure of the death of its prey would swallow it head downward. As the pouched gopher is the curse of the Western country these birds become very useful. They also eat many frogs, but in this they may not be so beneficial, especially as we recently found in a frog's stomach a red-legged grass-



hopper, four ground beetles (Carabids), three Colorado potato beetles, and a house fly. (May this emphasize the value of frogs and toads as insect destroyers.)

We have found in the stomach of the Blue Heron, short-tailed field mice or moles, fishes, cray fish and many insects (mostly aquatic), including larvæ and pupæ of the mosquito. It is to be regretted that so many thoughtless gunners shoot these graceful birds for mere sport.

The Bitterns belong in this family. We have found many insects in their stomachs, although their principal food is squirrels, fishes, frogs, tadpoles and worms. The larger Bittern is sometimes called "Stake Driver," "Boomer" or "Thunder Pumper," because in the spring it makes a noise such as might be produced by driving a stake in a hollow log. To this family also belongs a bird of which much has been said and written lately in America. This is the Egret, or Aigrette, and now after it is almost too late, attention is being called to the great evil of slaughtering them for millinery purposes. The most deplorable feature is that the plumes, so proudly worn by so many thoughtless women, were the wedding plumes that ornamented the backs of the birds and could only be secured by killing the parents while their nests contained young, the latter being left to die of starvation. The scenes at the nesting places were appalling. Forty thousand have been slaughtered and sent to New York City at a single shipment, and that means that over eighty thousand young have been left to die of starvation at one time. Educated persons agree that anyone who wears egret tips for personal adornment is either cruel, thoughtless or ignorant.

The Night Heron is a peculiar bird which takes its name from its habit of feeding after night. It is sometimes called "Qua" or "Squawk" bird, from its powerful note. We have known it to be mistaken for the cry of a wild cat. The birds of this family generally build rudely constructed nests of coarse twigs in a group or colony called a "herony." It is quite interesting to visit such a place, but the noise made by the birds is simply deafening.

There is another interesting and as far as we known unrecorded peculiarity of the members of the Heron family. This is the inclination and really the effort of the wounded bird to strike at the eye of its captor. We have personally observed or recorded authenticated instances of, at least, one example of each species of this family when wounded striking quite viciously at the eye of its captor. Their necks are so long and they strike with such skill and force that they might produce serious injury.

## ORDER VI. PALUDICOLÆ. CRANES, RAILS, ETC.

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The true cranes are found only in the South and West, and are not of sufficient importance in Pennsylvania to enter into this discussion. The Rail family (Rallidæ) is chiefly of interest because it contains several well-known game birds. Their habits and abodes are all much alike; they live in reedy swamps where they can pick insects, worms, etc., from the moist surface of the ground or bottom of shallow, quiet pools. They are very shy birds and are seldom seen by a person in walking through the swamp. But if one should stop in the swamp for some time, remaining perfectly quiet, he might see several skulking around among the weeds like shadows. Should a stone or log be cast into the bog they inhabit, they will set up a din only to be compared with a hundred frogs in full chorus.

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## ORDER VII. LIMICOLÆ. THE SHORE BIRDS.

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The order Limicolæ or Shore-birds is composed of several families, the most important of which are the Snipe and Plover families. The former have the tarsus scutellate in front and the latter have it reticulate; also all of the Snipe family, but the Sanderling, have four toes, and all of the Plovers but the Black-bellied or Ox-eye have but three toes. These are all rather small birds and may be found abundantly along almost every shore and marsh.

The Snipe all have bills which are sensitive toward the tip and may be used as a touch organ in probing mud for food. Their chief food is worms, insects, etc., which they procure from the surface of the ground or by sucking it up from the mud. Their bills are so constructed that they can be inserted into the mud and then opened at the tip only. This facilitates searching for food by the sense of touch. Several of the so-called "game birds" belong to this family, but it must be understood that there is no natural boundary line separating game birds from others. One of the best-known birds of the Snipe family is the Woodcock, that bird which has been described as "all bill with its eyes on the top of its head." Since



these birds all frequent wet places, and live on and in the mud, they cannot remain in such places during the winter when it is frozen. Hence they are regular migrants, being found toward the north in summer only.

The presence of the Woodcock is readily detected by hunters, who examine the soft mud of swamps and creek banks for its "borings," which are holes about the diameter of a lead pencil, made by the long, flexible and sensitive bill when inserted into the mud for food.

The Plover family contains small birds. Their bills are not soft and sensitive, but hard and pointed at the tip and much shorter than those of the Snipes. They are insectivorous and should be protected. Some of them are upland birds, such as the Kildeer, and are commonly seen in flat, damp, open fields. It has been said that the Kildeer will live only on poor or unproductive soil, but we have known it to nest on soil as fertile as any to be found. Its nest is placed on the bare ground, between lumps of earth or stone, without much nesting material. There are three or four eggs which are buff and spotted with chocolate. Like the eggs of nearly all birds that nest on the ground, they are pointed and much larger at one end than at the other. This shape insures their rolling in a circle when disturbed, and also enables them to fit snugly together, pointed ends inward, under the body of the incubating bird. The color of the eggs is almost exactly that of the ground on which they are placed. Protective coloration is also shown in the birds, which sit so quietly on their nests that a person would almost tread upon them without seeing them. When the female is hatching, or has her young beside her, she will feign injury and imitate the actions of a bird with a broken wing so perfectly that a pursuer, in the effort to capture her, is led far away from her precious charges. The young are so nearly the color of the soil where they live that it is almost impossible to see them. Thus does a mother's love and efforts, even with the birds, secure the life and liberty of her offspring.

(TO BE CONTINUED.)

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THE ECONOMIC VALUE

OF

OUR NATIVE BIRDS.

PART II—BY ORDERS AND FAMILIES.

ORDER VIII. RAPTORES: THE BIRDS OF PREY.

FAMILY 11. CATHARTIDÆ. THE VULTURES.

FAMILY 12. FALCONIDÆ. THE HAWKS, ETC.

(To be continued in future parts.)

(Sent free upon Application. Back Numbers sent upon Request.)

BY H. A. SURFACE, M. S., *Economic Zoologist.*

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## A GENERAL DISCUSSION OF THE ECONOMIC FEATURES OF OUR NATIVE BIRDS,

BY ORDERS AND FAMILIES.

### PART 2.

#### Family 11. The Vultures. Fam. 12. Hawks, Etc. Continued From the Zoological Quarterly Bulletin for August: Vol. I, No. 2.

By H. A. Surface, Economic Zoologist of the Pennsylvania Department of Agriculture, and Ornithologist of the Pennsylvania State Board of Agriculture.

(N. B. This bulletin is re-written from a series originally published by the author, in 1898-9, in a periodical entitled *American Gardening*, N. Y.; with copious extracts from Bulletin No. 3, of the Division of Ornithology and Mammalogy—now Biological Survey—of the Department of Agriculture, by Dr. A. K. Fisher, with kind permission of Dr. Fisher. Since that very valuable bulletin, entitled "The Hawks and Owls of the United States in their Relation to Agriculture," is entirely out of print and copies are not to be obtained from Washington, we have felt justified in quoting from it more freely than has been our custom, in order to give our thousands of readers the benefit of the very valuable and practicable knowledge which it contains and which would not otherwise be available at present for most persons.)

ORDER VIII. RAPTORES: The Raptorial Birds, or Birds of Prey. (See page 6, of *Zoological Quarterly Bulletin*, No. 2.)

#### Family 11. Cathartidæ. The Vultures.

The Vultures, comprising the ornithological family Cathartidæ, may be distinguished from all other birds by the fact that their heads are entirely unfeathered or else only partially covered with down (young); nostrils long and narrow, extending lengthwise of the bill, a definite basal web between the inner toe and the middle toe; and the hind toe is short and elevated, the feet not being adapted for grasping.

To this rather small family of large birds belongs the Condor of



South America, which vies with the oceanic Albatross for the reputation of being the largest bird that flies, and which has such famed power of endurance while on the wing.

The representative of the family that is often found in Pennsylvania is the Turkey Vulture or "Turkey Buzzard" (*Cathartes aura*). This may be distinguished at a distance by its soaring flight, often moving for great distances, also soaring in circles, without perceptibly moving a wing. It may also be known by its uniform dark color and the red unfeathered head. It is thus easy to know the vulture from the hawks, even at a distance, by the soaring flight and the uniform dark color of the former.

While the Turkey Vulture is very rare in the northern portions of this State, as well as at the higher altitudes, it is abundant along the southern boundary, nesting in the southeastern portion, and it is very common throughout the States south of us. In the higher mountainous regions its place in nature, as a scavenger, is taken by the Raven. It nests in hollow trees, stumps, logs, under fallen trees, cliffs, etc. Its two eggs are large and whitish, mottled with brown and gray, and its young are snowy white.

The word "Turkey" is prefixed to the name of this bird because of its slight external resemblance to the King of American Game Birds and Domesticated Fowls, but in habits and edibility there is not the slightest relationship to our Thanksgiving emblem. All members of the family Cathartidæ are strictly carrion-eaters and thus perform an office in nature that is very important to mankind for sanitary reasons. This is why these birds are protected by law in most states of the Union. In the southern states they are so numerous as to be able to clear away all perishable remains of a dead horse within two days, and in the streets of the most of the southern cities they may be seen roaming at will, unmolested, and feeding upon such scraps as fall to the lot of the scavenger. The Gulls and Vultures bear to the class of birds the same relations as the eels, bowfins and catfishes to the fishes, as the rats and opossums to the mammals, and certain flies and beetles to the insects.

#### Family 12. Falconidæ. The Kites, Hawks, Eagles, Falcons, Osprey, etc.

The Hawks and Owls (Family Budonidæ, to be discussed later), constitute the chief Birds of Prey which are of great importance in this State. In general the four following facts are now established in regards to Hawks and Owls:

No birds are more beneficial to the interests of the husbandman than are these.

None are less fully known and less appreciated for their good effects.

None are more mercilessly slaughtered by nearly all persons at all times.

None should be more rigidly protected by law and public sentiment for the sake of the growers of crops.

In general, the Hawks may be called the diurnal predaceous birds, or those that feed by daylight. A few owls occasionally have this habit, but in general, the owls are the nocturnal Birds of Prey, feeding almost wholly at night, when stealthy creatures prowl and feed.

The Hawks and Owls agree in having feathers on the head, hind toe large, level with the others and furnished with a strong sharp claw, and feet well adapted for grasping. The Hawks differ from the Owls by the fact that in the former the eyes are lateral or directed sidewise instead of being directed forward, as in the owls. Also in the hawks the cere or waxy membrane over the bill is not covered by bristles, as in the owls, and the outer toe can not be reversed or turned to grasp from behind, as it can by the owls. In general, the hawks have strong, rigid, harsh feathers, and pronounced light colors beneath, with dark above; while the owls have very soft feathers that make no noise in flight, and subdued colors of gray or brownish, not varying greatly below and above.

While there are several kinds of hawks in the United States only about a dozen (including the Eagles), are sufficiently abundant in Pennsylvania to demand attention for their economic features. These are here mentioned in detail, with results of the study of their stomach contents by Dr. Fisher. Because Dr. Fisher's monumental work on "The Hawks and Owls of the United States in their Relation to Agriculture," is now out of print and not available for the majority of our readers we here quote freely from it, with his kind permission.

The Kites. These birds are southern and western in their distribution, rarely being seen in Pennsylvania. Their food is proven to be almost entirely serpents, lizards, insects and snails.

The Marsh Hawk (*Circus hudsonius*\*). This hawk is to be known from all others by the white rump or patch on the back just above the tail. It lives mostly in marsh regions, seldom being seen in the uplands. Its nest is made on the ground, often on a tussock, where it lays from four to six eggs. Of 124 stomachs examined, 7 contained poultry or game birds; 34 contained other birds; 57, mice; 22, other mammals; 7, reptiles; 2, frogs; 14, insects, and 8 were empty. Among the mammals are the following: Field mouse, pine mouse, gopher, ground squirrel, chipmunk, red squirrel, rabbit, shrews and skunk. Among the birds eaten are young wild duck (rarely), rails, woodcock, quail, blackbirds, several kinds of sparrows, including the English

\*For the use of scientific names, see Vol. I, No. 2, pp. 2 and 3.



sparrow, junco or snow bird, indigo bunting, robin, and mocking bird. Of course these stomachs were from birds collected at various seasons and in different parts of the United States. This accounts for the wide variety in the list, but it is remarkable that as common as is the Marsh Hawk in this State poultry was not found to be an important feature of its food. The only conclusion is that it is more beneficial than injurious in its feeding habits.

Dr. Fisher says, "Although this hawk occasionally carries off poultry and game birds, its economic value as a destroyer of mammal pests is so great that its slight irregularities should be pardoned. Unfortunately, however, the farmer and sportsman shoot it down at sight, regardless or ignorant of the fact it preserves an immense quantity of grain, thousands of fruit trees, and innumerable nests of game birds by destroying the vermin which eat the grain, girdle the trees, and devour the eggs of young birds.

The Marsh Hawk is unquestionably one of the most beneficial as it is one of our most abundant hawks, and its presence and increase should be encouraged in every possible way, not only by protecting it by law, but by disseminating a knowledge of the benefits it confers. It is probably the most active and determined foe of the meadow mice and ground squirrels, destroying greater numbers of these pests than any other species, and this fact alone should entitle it to protection even if it destroyed no other injurious animals."

Isn't it evident that the next time the gunner sees a hawk of medium size fly across the marsh or meadow and display a white cottony patch between the wings and the tail, on the back, that he should deny himself the doubtful pleasure of killing this creature, in recognition of the valuable services it would render to the husbandman if permitted to live?

The Sharp-shinned Hawk (*Accipiter velox*). There are several things to be said about this bird. It is among the commonest, best known and most objectionable or "blackest" of the birds of prey found in this State, and doubtless is more injurious to young poultry and small birds than any other kind of creature found within our borders.

The Sharp-shinned hawk is variously known as "Pigeon hawk," "Partridge hawk," "Little Quail hawk," etc. Although this is almost our smallest hawk, being only ten to fourteen inches long, it is one of the most daring of birds. Its flight is swift but irregular, and it catches great numbers of small birds as its food. Of 159 stomachs examined, 6 contained poultry or game birds; 99, other birds (representing about forty-five different species); 6, mice; 5, insects, and 52 were empty.

Thus the Sharp-shinned hawk is the first to go on our "black

list." It is fond of young poultry, and kills too many beneficial small birds, while it eats comparatively few mice and other obnoxious mammals.

Among the birds that it has been known to eat, besides pigeons and young poultry, are the following: Quail, dove, downy woodpecker, flicker, chimney swift, cow bird, oriole, blackbird, purple finch, American goldfinch, several species of sparrows (native), Junco or snowbird, English sparrow, vireo, several species of warblers, oven bird, mocking bird, catbird, thrashers, nuthatches, chickadee, kinglet, the thrushes, robin and bluebird. Surely this is a serious list from the point of view of the bird protectionist.

No wonder Dr. Fisher says of the Sharp-shinned: "Little can be said in favor of this hawk, although its daring, courage and impudence are to be admired. On this and the two following species mainly rests the responsibility for the ill favor with which the other hawks are regarded. A score of valuable species suffer because they belong to a class which includes two or three noxious kinds. However, like most villains, it has at least one redeeming quality, and that is its fondness for the English sparrow, our imported bird- nuisance. This hawk is gradually learning that there is a never-failing supply of food for it in the larger towns and cities. The Sharp-shinned hawk is not uncommon in Central Park, New York, all through the winter, where the writer has witnessed it chasing sparrows, as he has also in some of the larger parks in Washington, D. C. Numerous reports from various towns and villages show that the habit of visiting such places for the sparrow is becoming common." It will be observed in our following pages that the same habit is becoming an important desirable trait of the little Screech Owl.

Cooper's Hawk (*Accipiter cooperi*). This justly condemned bird is very similar to the preceding, but differs from it chiefly in size, being six inches longer and larger in every way. Also its outer tail feathers are shorter than the middle ones, instead of being the same length, as in the former species. It is quite common and is often called the "Long-tailed Small Chicken Hawk." Most of the birds of this species migrate to the southward from this State during the winter.

Since this is a larger bird than the preceding it can and does kill and eat larger birds, older poultry, and larger mammals than does the Sharp-shinned hawk. The students in Economic Zoology in the Pennsylvania State College have found in its stomach the remains of ruffed grouse, quail, English sparrows, numerous song birds, poultry, field mice, frogs, and insects, especially the red-legged grasshoppers. Dr. Fisher publishes that of 133 stomachs examined,



39 were empty; 34 contained poultry or game birds; 52, other birds; 11, mammals; 1, a frog; 3, lizzards and 2, insects.

This is a very bad record and shows Cooper's hawk to be one of the most obnoxious of all the hawks and owls, and it is thus the second to go on the "black list." One of these birds, or a pair of them, may form the habit of visiting a certain dove cote or poultry yard every day until nothing remains for it to carry away. The best thing to do for such a marauder is to lie in concealment for it with a shot gun properly loaded. As it is very bold in its flight and attacks, it may be shot easily while on a foraging excursion. Among the mammals that it has been known to eat are the opossum, rabbit, chipmunk, ground squirrel, squirrel, rat and mice; and among the birds, besides poultry, are the ruffed grouse, quail, dove, flicker, meadowlark, blackbird, goldfinch, several species of native sparrows, English sparrow, Junco, cheewink, warblers, nuthatch, thrushes and robin. Dr. Fisher says of it: "This is pre-eminently a 'chicken hawk,' as may be seen from the foregoing citations. Its devastations in this direction are much greater than those of all the other hawks and owls together, with the possible exception of the Sharp-shinned hawk, which attacks smaller chickens.

Like the Sharp-shinned hawk this species has learned that the English sparrow is not only an acceptable article of food, but is also a readily accessible one. Consequently of late years it has been much more common during the winter months in the larger parks of cities, where it spreads terror among the sparrows."

The Goshawk (*Accipiter atricapillus*). This is also called the "Blue Hen Hawk" and "Big Blue Hen Hawk." It is distinguished by its large size (two feet long); bluish slate color above; black top of head; light or ashy under parts, crossed by narrow gray lines, and dusky to black narrow stripe on shaft of each feather.

It is not common in Pennsylvania, being a northern bird and coming into our State mostly during the winter season. It occasionally nests in the higher and wooded portions of the northern part of this State, but it is known mostly to hunters as a winter migrant and an inhabitant of the woodlands instead of the swamps and open country.

Of 28 stomachs examined, 8 were empty; 9 contained poultry or game birds; 2, other birds; 10, mammals; 3, insects, and 1, a centipede. The list of mammals that it has been known to eat includes the following: Cotton-tail rabbit, northern or varying hare, gray squirrel, red squirrel, weasel and mice. The list of birds, besides poultry, includes the ruffed grouse, quail and the mourning dove. The students in the class in zoology in the Pennsylvania State College found the stomachs of this species to contain portions of the

following: Rabbit, ruffed grouse; quail, chicken and a great quantity of buckwheat. The latter was doubtless taken by swallowing the crop of a luckless grouse or "pheasant," as this noble game bird is erroneously called in many parts of our country.

"The Goshawk, like the two preceding species of the genus, feeds largely on the flesh of birds, and to a less extent on mammals. Poultry, ducks, grouse and many smaller birds, together with hares, squirrels and other rodents make up its fare. Fortunately, in most farming districts, at least in the United States, it is comparatively rare except during the fall and winter months, otherwise its depredations among the poultry would be a very serious matter. Its large size and greater strength enable it to carry off heavier quarry than Cooper's hawk, and consequently its powers for mischief are more to be dreaded by the poultrymen."

"This species is one of the most daring of all the hawks, and while in pursuit of its prey it is apparently less concerned by the presence of man than any other. It will dart down unexpectedly at the very feet of the farmer and carry off a fowl."

"In the general character of its flight, as well as the mode of hunting and capturing its prey, it closely resembles Cooper's hawk, though it frequents the thick woods rather more than the latter bird. In the fall this bird is common along the smaller water courses, where it is very destructive to wild ducks and other water fowl, and is able to strike down a bird as large as a full-grown mallard. If its prey is a bird of this size it rarely eats more than the flesh from the breast, leaving the rest of the carcass untouched. Scorning to feed upon carrion, another victim is secured when hunger returns."

The above extracts are so well written and, in general, so accurate that we hesitate to add any results of personal observations which would appear discrepant to any part, but the last sentence quoted has been widely copied without that reservation which the author would doubtless make had he the time and opportunity. It not only imputes to these birds the power to "scorn" and a consequent attending nobility, but is not wholly accurate from a scientific standpoint. There is now in the museum of Cornell University a Goshawk which the writer skinned and mounted, and which was caught in a steel trap set on the body of its victim of the previous day, to which it had returned and was thus captured. This also indicates a practical method of capturing many of the enemies of the poultry, as most of them (probably all of those creatures that eat the flesh) that kill a fowl or mammal larger than they can devour at one feeding return to the remains for another meal when they become hungry. Poison is often used to advantage in such



cases, but the objection to this is that it might destroy desirable cats and dogs.

The Red-tailed Hawk (*Buteo borealis*). This is also known as the "Hen Hawk," and is one of the commonest and best known of our larger hawks. It is known from others by the deep rusty brown color of the tail and the single dark subterminal tail band of the adult. The tail of the young is not red but bright grey and crossed by six to ten regular dark bands. This is one of our larger hawks, being from 19 to 25 inches in length, the female being the larger, as in the other hawks and owls. It is a common and permanent resident of our State and nests throughout its area. In habits it differs decidedly from the preceding in that it frequents the open country and cultivated lands rather than the remote recesses of the forest.

"Its large size, wide distribution and habit of frequenting open ground while hunting, cause it to be noticed by the most indifferent observer. The careful study of the food of this hawk is of the greatest economic importance. The more so from the fact that like its congener, the Red-shouldered hawk, its inappropriate name 'Hen hawk,' stimulates an unceasing warfare against it. The farmers, who are chiefly benefitted by it, are its most pronounced enemies, because of the erroneous belief that the Red-tailed hawk is a persistent and destructive enemy of poultry.

A species as powerful and numerous as this must exert a marked influence for good or evil on agriculture, according as its food consists of beneficial or injurious forms of animal life.

Abundant proof is at hand to show that this hawk greatly prefers the smaller mammals, reptiles and batrachians, taking little else when these are obtainable in sufficient numbers; but if hard pressed by hunger it will eat almost any form of animal life, such as poultry and other birds, insects, crawfish and even offal or carrion.

It is to be remarked that young hawks are less particular as to the character of their food, and they are more frequently found to be the depredators of the poultry yards. The reason for this seems to be a lack of skill in procuring a sufficient quantity of the more usual prey.

Of 562 stomachs examined by the author, 54 contained poultry or game birds; 51, other birds; 278, mice; 131, other mammals; 37, batrachians and reptiles; 47, insects; 8, crawfish; 13, offal, and 89 were empty. It has been demonstrated by careful stomach examinations that poultry and game birds do not constitute more than 10 per cent. of the food of this hawk, and that all the other beneficial animals preyed upon, including snakes, will not increase this proportion to 15 per cent. Thus the balance in favor of the hawk is at

least 85 per cent., made up largely of various species of injurious rodents—a fact that every thoughtful farmer should remember. It is not to be denied that a great deal of poultry is destroyed by this hawk, but the damage done is usually among the less vigorous fowls in the late fall, and in view of the great number of injurious rodents as well as other noxious animals which this hawk destroys it should seem equivalent to a misdemeanor to kill one, except in the act of carrying off poultry. The fact that there are robbers among hawks is no sound argument for exterminating any and every one." (Fisher).

This emphasizes the point which we have made in previous articles that an individual bird, like an individual cat or man, may form a particularly obnoxious habit, and should then receive individual treatment instead of becoming the basis for unjust condemnation of all of its kind. One hawk of this species may become accustomed to feeding more or less regularly at the poultry yard, while nearly all others may be out catching injurious creatures. The proper course of procedure is to destroy the obnoxious one, but preserve the others that are beneficial. The last specimen of the Red-tail which we received was an example of the depraved type of individual. It had become a too frequent visitor of a poultry yard near Westtown, Pa., and fell a victim to a trap placed on top of a pole for its capture.

Among the mammals which the Red-tailed hawk is known to have eaten are the following: Red squirrel, gray squirrel, chipmunk, western ground squirrel, house mouse, rat, field mice, voles, woods rats, jumping mice and rats, porcupine, rabbit, skunk, shrews and mole. We have often found from two to four mice, especially short-tailed meadow mice or voles (commonly called "field moles") in the stomach of a single one of these hawks. As these are undoubtedly the most destructive animals on the farm, the value of the Red-tailed hawk becomes at once apparent. "Meadow mice seem to form the staple article of its food, although at times other species of mice, arboreal and ground squirrels, rabbits or an occasional mole or shrew are among the stomach contents. This hawk and its allied species render valuable service in reducing the numbers of ground squirrels and rabbits, so abundant and excessively injurious to crops in some parts of the west." Thus we see that, with occasional individual exceptions, the Red-tailed hawk is among the birds to be carefully protected and encouraged.

Among the species of birds it has been known to eat are the following: Wild duck, rail, quail, ruffed grouse, dove, screech owl, woodpecker, horned lark, crow, meadow lark, oriole, blackbird, native sparrows, Junco, robin and bluebird.



The Red-shouldered hawk (*Buteo lineatus*). This is one of our most common hawks of medium to fair size, and is often seen in the cultivated portions of our State as well as in the mountain regions. "This and the Red-tail are the commonest hawks in the State (of N. Y.) and the ones to which the names Chicken hawk and Hen hawk are generally applied. The loud screaming "kee-yeer, kee-yeer" of the Red-shoulder as he sails far above the earth is a familiar sound and usually, though wrongly, associated by the farmer with depredations in the poultry yard." (F. M. Chapman, in the Seventh Report of the N. Y. Forest, Fish and Game Commission.)

As its name implies, the Red-shouldered hawk may be distinguished from the other hawks of the State by the more or less rusty red color of the "shoulder" or front angle of the wing, which really corresponds to the elbow. Also, the outer web of the wing feathers are distinctly spotted with a light color, and the tail is black, crossed by about six bands of white. It is smaller than the preceding, being from 17 to 22 inches in length. It is a summer resident of this State, nesting throughout its area.

"The diet of the Red-shouldered hawk is probably more varied than that of most birds of prey. For example, the writer has found in the stomachs of the different individuals which have come under his notice the remains of mammals, birds, snakes, frogs, fish, insects, centipedes, spiders, crawfish and snails, which represent eleven classes of animal life. This hawk is very fond of frogs, and, although these batrachians are mentioned by Audubon and other writers as forming a considerable portion of their sustenance, yet mice furnish fully 65 per cent. of their food. Besides this very injurious group of rodents, other small mammals, such as squirrels, young rabbits, shrews and moles, are taken.

Some writers insist that the Red-shouldered hawk is injurious to poultry, but the writer in all his field experience has never seen one attack a fowl, nor has he found the remains of one in the stomachs of those examined. In making this statement he does not include the poultry which is eaten in the form of offal, for in severe weather when the ground is covered with snow and when food is scarce, the Red-shouldered hawk will devour dead chickens which have been thrown out from the yard, as well as other refuse found on the compost heaps or in the vicinity of slaughter houses. At such times the writer has often captured specimens of this hawk, as well as of crows, blue jays, red and flying squirrels, in steel traps set near a piece of chicken, rabbit or beef fastened in a tree.

In a communication received by the U. S. Department of Agriculture from Mr. J. Alden Loring, of Owego, Tioga county, N. Y., in September, 1889, he gives the following testimony in reference

to this bird: "The pair reared their young for two years in a small swampy piece of woods about fifty yards from a poultry farm containing 800 young chickens and 400 ducks, and the keeper told me he had never seen the hawks attempt to catch one." It is extremely improbable that this slow-flying hawk often captures birds, except such as are disabled.

Among the insects which are destroyed in considerable numbers by this bird, may be mentioned grasshoppers, crickets and various kinds of beetles and caterpillars. Even in December and early January, when apparently all insect life is in a dormant state, specimens of the Red-shouldered hawk are found whose stomachs are filled with one or more species of insects."

Of 220 stomachs examined, 2 contained poultry; 1, a quail; 12, other birds; 102, mice; 40, other mammals; 20, reptiles; 39, batrachians; 92, insects; 16, spiders; 17, crawfish; 1, earthworms; 2, offal; 3, fish, and 14 were empty. Among the mammals were shrews, voles, mice, opossum, rabbit, mole, chipmunk, red squirrel, muskrat and skunk. We have commonly found mice in their stomachs, especially field mice, voles, and house mice.

Among the birds which they are known to have eaten are the following: Carolina rail, quail, dove, screech owl, flicker, crow, meadow lark, native sparrows, English sparrows, Junco and robin.

Thus the Red-shouldered hawk is proven to be one worthy of protection with the Red-tailed and others to be discussed subsequently.

Broad-winged Hawk (*Buteo latissimus*). Among the less numerous and consequently less important hawks of this State is the Broad-winged, which is also erroneously called a "Chicken hawk." It is smaller than the preceding, being from thirteen to eighteen inches long. The adult is brownish dusky color above, and beneath brownish or reddish with white spots; tail black, with a few broad whitish bands.

The Broad-wing is also a summer resident of this State, migrating southward to the West Indies and South America in winter.

Of 65 stomachs examined, 2 contained small birds; 15, mice; 13, other mammals; 11, reptiles; 13, batrachians; 30, insects; 2, earthworms; 4, crawfish and 7 were empty. Among the mammals eaten were the red squirrel, field mouse, pine mouse, mole, shrews, chipmunk, rabbit and common rat.

"The food of this hawk consists principally of insects, small mammals, reptiles and batrachians, and occasionally of young disabled birds.

Among mammals the smaller squirrels and wood mice are most frequently taken, though field mice and shrews are also found in the stomach contents.



During August and September a considerable portion of the food consists of the larvæ of certain large moths which are common at this season, notably those of the elm sphinx, of the Cecropian moth and of the Polyphemus moth, and it is the exception not to find their remains in the stomachs examined. Grasshoppers, crickets and beetles are also greedily devoured.

The only act of the Broad-winged hawk which seems injurious to agriculture is the killing of toads and small snakes; the former of which are exclusively insect-eaters, the latter very largely so. In one respect its enormous value ranks above all other birds, and that is in the destruction of immense numbers of injurious larvæ of large moths, which most birds are either unable or disinclined to cope with. The good service it does should secure the protection extended to the other Buteos."

The Rough-legged hawk (*Archibuteo lagopus sancti johannis*). The Rough-legged or Black hawk is another of our less common large hawks. It is known in all stages by the fact that it is the only hawk that has the feathers extending entirely to the base of the toes in front and at the sides of the leg, as has the Golden Eagle; also, by the more or less grayish brown of the adult, with whitish head and white on and under the tail. The plumage of the younger birds is nearly black, both above and beneath, with whitish under side of tail. It is due to the color of this stage that it is often called the Black hawk. The adult also has blackish wing spots under its wings, by which it may be known as it flies.

The Rough-leg is strictly a hawk of the winter time, nesting north of the United States, and feeding during the winter just south of the snow belt. It is not an uncommon winter visitor in meadows and along our streams. Dr. Fisher says of it: "The Rough-leg is one of the most nocturnal of our hawks, and may be seen in the fading twilight watching from some low perch, or beating with measured, noiseless flight, over its hunting ground. It follows two very different methods in securing its food, one by sitting on some stub or low tree and watching the ground for the appearance of its prey, as the Red-tail does; the other by beating back and forth just above the tops of the grass or bushes, and dropping upon its victim, after the manner of the Marsh hawk. Its food consists principally, if not almost exclusively, of the smaller rodents, and most prominent among these are the arvicoline mice and lemmings. As is well known, the meadow mice (*Arvicolæ*) are widely distributed over the north temperate zone, and often occur in immense numbers, overrunning certain sections of the country, and doing irreparable damage to crops as well as to fruit and ornamental trees. Repeatedly young orchards, consisting of hundreds of trees, and representing

great money value, have been totally destroyed by these pests. The damage is done in winter, under the snow, where the mice eat the bark from the trees, often completely girdling them and causing their death. Usually meadow mice are fairly common if not abundant over a large part of the meadow and marsh lands of the central and northern United States and temperate Canada. To show how important meadow mice are to the Rough-leg as an article of food, it may be stated in general terms that the southern limit of its wandering in winter is nearly co-incident with the southern boundary of the region inhabited by meadow mice. In the north lemmings are abundant over the country in which the Rough-leg makes its summer home, and furnish a never-failing supply of food for old and young."

Of the 49 stomachs examined, 40 contained mice; 5, other mammals, 1, lizards; 1, insects and 4 were empty.

The Golden Eagle (*Aquila chrysaetos*). The Golden eagle may be at once known by its immense size, its general dark color, without white, and the feathers extending down the legs entirely to the toes. It is from thirty to forty inches long, being the largest rap-torial bird of this State, and with the exception of the wild turkey it is the largest bird known in Pennsylvania. It is found here only in the winter season, and so rarely during recent years that it really does not now play an important part in the economic zoological features of our State.

There have been many stories of eagles carrying away children, but for some years we have made a careful effort to follow up all such reports that are published, and have not yet been able to find one undoubted and well-established instance of this kind of an attack by a bird.

"The food consists mainly of mammals and birds, of which sper-mophiles (western ground squirrels), rabbits, fawns, lambs, turkeys, grouse, water fowl and other large birds form the principal part, though offal and carrion are sometimes taken.

To sum up, it may be said that in sections of the country where rabbits, prairie dogs or gophers are abundant the Golden eagle is very beneficial, confining its attention mainly to these noxious animals; but in places where game is scarce it is often very destructive to the young of domestic animals, and hence in such places has to be kept in check."

The Bald Eagle (*Haliaeetus leucocephalus*). The Bald Eagle is so-called from the fact that after the third year its head becomes white, having a "bald" appearance at a distance. The young of this bird very closely resembles the Golden eagle, but whether young or adult they may always be distinguished by the fact that



the latter has the feathers of its legs extending entirely to its toes, while those of the Bald eagle do not reach down to the toes by an inch or more. Although this bird is not abundant here, we have seen it in this State at all seasons. While it is more common than the Golden eagle, it is too rare to be very important at present in its biological relationships in Pennsylvania. While it is the emblem of our nation, there is no doubt that the wild turkey would have been a more appropriate and noble choice. The Bald eagle has not the "dignity" that is often attributed to it by sentimentalists.

"The favorite food of the Bald eagle is fish, and when this vertebrate can be secured the bird will touch little else. Of the hundreds of these eagles which the writer has watched, none were observed ever to touch anything else except fish or offal picked up from rivers or along their shores. What proportion of the fish consumed is taken from the Osprey is hard to estimate, but the number must be very great.

"What we have said in reference to the Golden eagle applies equally well to the bird under consideration, namely, that over the greater part of the country where the natural food, fish in the present case, is abundant it is a harmless bird and should be protected; while in sections where it is injurious to sheep or other domesticated animals, it should not be allowed to become numerous."

Of 21 stomachs examined, one contained a game bird (wild duck); none, poultry; 5, mammals; 9, fish; 2, carrion, and 5 were empty.

The Duck Hawk (*Falco peregrinus anatum*). This raptorial bird is not common in our State excepting along the larger streams and at lakes, although it is occasionally seen in other parts. It can be distinguished by the constant fact that the first and second wing feathers are equal in length and longer than the others. Also, by the black crown of the adult, creamy to buff chest and dark cross markings ventrally.

The Duck hawk nests in this State, especially in the counties adjoining the Susquehanna river. It leaves these haunts during the winter and spreads over the uplands, and also migrates to us from the northern regions; hence, it is more likely to be seen and shot during the winter than in summer.

"The food of this hawk consists almost exclusively of birds, of which water fowl and shore birds form the greatest part. In sections of the country where its nesting site is surrounded by cultivated lands, the bird is complained of bitterly by the farmers on account of the inroads it makes on poultry.

It sometimes takes comparatively small birds. Dr. E. A. Mearns found in the stomach and crop of one he secured at Sayville, Long Island, the remains of a robin, grey-cheeked thrush, catbirds and

warblers; and Dr. J. G. Cooper says: 'I have seen one pursue a swallow, and turning feet upwards seize it flying, with perfect ease. I have also seen them pursue quail near the coast; but their chief prey consists of ducks and other water birds, which they seize on the wing or in the water, frequently carrying off birds heavier than themselves.'

The Duck hawk is one of the few birds in whose favor little can be said. It is fortunate for the poultry raisers that the species is comparatively rare throughout our country, and that it is restricted to a large extent to the shores of the ocean and inland bodies of water. The following species of birds were positively identified among the stomach contents: Blue-winged teal, quail, dove, thrasher, thrush, catbird and robin.

Of 20 stomachs examined, 7 contained poultry or game birds; 9, other birds; 1, mice; 2, insects (beetles and dragon flies), and 4 were empty.

The Pigeon Hawk (*Falco columbarius*). This is one of the smaller and rather rare hawks of the fall, winter and spring in this State. It is doubtful if it breed within our borders, as its nesting region is generally north of the parallel of 43 degrees north. In winter it is found as far south as South America. It is only from ten to fourteen inches in length, bluish gray or brownish above; whitish or rusty, streaked with brownish or dusky below; the middle tail feathers crossed by not more than four dark bands. As in all our hawks and owls, excepting the species next discussed, the sexes are colored similarly.

"This falcon, with the exception possibly of the Broad-winged hawk, is the least shy of all our diurnal birds of prey, and often may be approached within a few rods. It frequents the more open country and edges of woods and is common along the shores of large bodies of water. In September and October during the fall migrations large numbers pass along certain of the sea beaches.

The flight is very rapid, and resembles that of the wild pigeon quite closely; nor does the similarity end here, for while sitting on a tree the general poise is that of a pigeon in repose, and specimens have been mistaken and shot for the latter bird.

The food of the Pigeon hawk consists mainly of small and medium sized birds, especially the gregarious species, insects and occasionally small mammals. Pigeons, flickers and grackles are about as large birds as it usually attacks, though Dr. Dall in one instance saw it kill a ptarmigan and Dr. E. A. Mearns speaks of a specimen shot in the act of devouring a hen. Among insects the dragon flies are favorite morsels for this hawk, and the apparent ease with which it captures these nimble-winged insects demonstrates better than



anything else its remarkable powers of flight. The writer has also found grasshoppers, crickets and beetles among the stomach contents.

Like the Duck hawk, the species under consideration occasionally captures small mammals when its ordinary food is scarce, though according to Dr. J. G. Cooper, it sometimes feeds quite extensively on them. He says: 'Though small, the pigeon hawk has all the fierceness and courage of a true falcon, and captures birds nearly as large as itself. It, however, chiefly follows the flocks of gregarious birds, such as blackbirds, doves, etc., and preys much on mice, gophers and squirrels. I have not heard of its attacking domestic poultry, and those farmers who shoot every 'chicken hawk' that comes around the house would do well to observe them more closely, and will discover that these small species are not the young of the larger ones, and should rather be encouraged than destroyed.'"

Of 56 stomachs examined, only 2 contained poultry; 41, small birds; 2, mice; 16, insects, and five were empty. Among the identified insects were grasshoppers, dragon-flies, caterpillars and beetles. Among the identified birds were the flicker, chimney swift, reed bird, goldfinch, brown creeper, Junco, indigo bunting, native sparrows, English sparrow, warblers, vireos, robin and tree swallow.

The Sparrow Hawk (*Falco sparverius*). This is the smallest, most beautiful, least obnoxious, and perhaps most useful hawk found within the limits of the Keystone State. It is also doubtless the most common hawk of the summer time throughout the State, but as it migrates southward from the northern portions in winter it is then found only along the southern side, especially in the south eastern quarter.

It is the only one of our raptorial birds in which there is a widely marked difference of coloration between the male and the female. The wing of the male is bluish gray, with black spots, while the wing of the female is brownish, with dusky spots; the tail of the male is rusty chestnut, with one broad black band toward the end, while that of the female is light brown to creamy, crossed with many narrow dusky bands. Length, 8 to 12 inches. The species may be distinguished by the small size, narrow pointed wings, and bluish gray to slate color on top of head.

"The subject of the food of this hawk is one of greatest interest, and considered in its economic bearings is one that should be carefully studied. The Sparrow hawk is almost exclusively insectivorous except when insect food is difficult to obtain. In localities where grasshoppers and crickets are abundant these hawks congregate, often in moderate sized flocks, and gorge themselves continuously. Rarely do they touch any other form of food until, either

by the advancing season or other natural causes, the grasshopper crop is so lessened that their hunger can not be appeased without undue exertion. Then other kinds of insects and other forms of life contribute to their fare; and beetles, spiders, mice, shrews, small snakes, lizards or even birds may be required to bring up the balance.

Mr. H. B. Hall, of Wakeman, O., writes to us as follows: 'The Sparrow hawk is a most persistent enemy of the grasshopper tribe. While the so-called hawk law was in force in Ohio I was township clerk in my native village and issued certificates to the number of eighty-six, forty-six being of the Sparrow hawk. I examined the stomachs and found forty-five of them to contain the remains of grasshoppers and the elytra of beetles, while the remaining one contained fur and bones of a meadow mouse.'

The late Townend Glover, formerly entomologist of the United States Department of Agriculture, states that the beneficial traits of this hawk more than counterbalance any harm it may do, and says, 'In proof of this, a Sparrow hawk, shot in October among a flock of reed or rice birds, was found filled with grasshoppers, and contained not the slightest vestige of the feathers or bones of birds. The bird was remarkably fat.'

In the vicinity of Washington, D. C., remarkable as it may appear to those who have not interested themselves in the matter, it is the exception not to find grasshoppers or crickets in the stomach of Sparrow hawks, even when killed during the months of January and February, unless the ground is covered with snow.

It is wonderful how the birds can discover the half-concealed, semi-dormant insects, which in color so closely resemble the ground or dry grass. Whether they are attracted by a slight movement, or distinguish the form of their prey as it sits motionless, is difficult to prove, but in any case the acuteness of their vision is of a character which we are unable to appreciate. Feeding on insects so exclusively as they do, it is to be presumed that they destroy a considerable number of beneficial kinds, as well as spiders, which they would find in the same locality as the grasshoppers. However, examination of their stomach contents shows the number to be so small, compared with that of the noxious species, that it is hardly worth considering.

After the severe frosts of autumn and in winter, when insect life is at its lowest ebb, the Sparrow hawks devote more time to the capture of mice and small birds. As a rule, the birds which they capture at this time are ground-dwelling species, which simulate the movements of mice by running in or about the dry grass and weeds. They are mostly sparrows, more or less seed-eating, and hence not among the species most beneficial to the agriculturist.



At this season it is common to see Sparrow hawks sitting on the poles over hay stacks, or stationed where they can command a good view of the surroundings of a hay mow or grain crib, ready at any moment to drop upon the mouse which is unfortunate enough to show itself. In this way they manage to destroy a vast number of mice during the colder months.

In the spring, when new ground or meadow is broken by the plow, they often become very tame if not molested. They fly down, often alighting under the very horses for an instant in their endeavor to capture an unearthed mouse or insect.

In the opinion of many people, unaccountable as it may appear, the benefit accruing from the destruction of a great number of mice or other injurious mammals or insects by hawks does not offset the damage done by the capture of one bird or chicken. This, of course, is not the case with those intelligent farmers who recognize the benefit done by this little hawk, and are not prejudiced against it if it extracts a moderate interest now and then in the shape of a young chicken or bird.

In May and June, when the hawks are busy hatching their eggs and rearing their young, there is less time for them to procure their favorite food.

It is during this period, as we might expect, that a very large proportion of the birds which they capture in the course of the year is taken. It is also at this time that we hear complaints of their depredations in the poultry yard."

Of the 320 stomachs examined, none contained poultry; only one contained a game bird; 53, other birds; 89, mice; 12, other mammals; 12, reptiles or batrachians; 215, insects (grasshoppers, crickets, locusts, caterpillars, larvæ, white grubs, beetles, dragon-flies, katydids, etc.); 29, spiders, and 29 were empty. The list of mammals included various species of field mice, shrews and the house mouse; while in the list of birds are found the following: Ground dove, meadow lark, red-wing blackbird, Junco, several species of native sparrows, English sparrow, vireo, wren, etc.

The Osprey (*Pandion haliaetus carolinensis*). The Fish hawk or American Osprey is found in the vicinity of fish-inhabited rivers and lakes in our State from spring until fall, nesting within our borders, and migrating southward in winter.

It can be recognized by its dusky brown color of upper parts, white under parts, dusky cheek band, and tail and wings banded with white and dusky, without black under wing patches as seen in the Rough-leg hawk, length 21 to 25 inches.

This bird is wrongly accused of destroying poultry. "The food of the Osprey consists entirely of fish, which it captures, although

in rare cases, when hard pressed, it has been known to pick up dead ones from the surface of the water. From the nature of its food it must of necessity dwell near bodies of water of more or less extent, which are inhabited by an abundance of fish, especially such species as habitually swim in schools near the surface.

Although the Osprey feeds exclusively on fish, which in any form are of more or less value to man, with few exceptions, it feeds upon such species as are of the least use as food. The fishermen, who are the ones most interested, welcome the appearance of this bird in the spring, as it indicates the advance of the schools of fish and, with few exceptions, they object to its being molested or killed. Fish hawks are encouraged to nest in the vicinity of the house, not only for the picturesque appearance of the nest and birds, but also because it is believed that they keep off other hawks which might do damage to the poultry.

The fish hawk is a gentle bird and never molests other species, even allowing the grackles and night-herons to build their nests and rear their young in the interstices of its own nest. Unlike the eagles, it is a brave bird, defending its home against intruders and even attacking man when he molests its eggs or young."

Of 12 stomachs examined, 11 contained fish and one was empty. Thus confirming the opinion of its being wholly piscivorous.

These birds are fitted by nature for the raptorial life they lead. Their strong curved beaks and sharp talons at once characterize them and place them in this common order.

With their eyes keener by far than man's, the hawks are on the alert for food every moment in the day, and when evening comes the owls have already awakened from their diurnal sleep and are continuing their search for rats and mice, "those Goths and Vandals of the animal kingdom."

In almost every State in the Union there are thousands of owls at the present moment hiding away in dark evergreens, hollow trees, or the darkened corners of buildings, digesting the remains of from one to six or eight mice they captured last night, and if they should be discovered, their lives would pay for the privilege of being beneficial and living near mankind.

The hawks are almost as absolute in the good they do, but whether large or small, they are rarely permitted to live on or near a farm. The old gun is always loaded for such supposed universal destroyers of property. But as we have before us an unimpeachable authority upon this subject, we shall refer freely to it and be more explicit in our statements.

We refer to that excellent publication, "The Hawks and Owls of the United States in their Relation to Agriculture," by Dr. A.



K. Fisher, under the direction of Dr. Merriam, being Bulletin No. 3, of the Division of Ornithology and Mammalogy of the United States Department of Agriculture, 1893 (unfortunately now out of print). Scientific experts examined the stomachs of about 2,700 of the various hawks and owls of the United States in order to determine the truth concerning their economic value in relation to feeding habits and the interests of mankind. "The result proves that a class of birds commonly looked upon as enemies of the farmer and indiscriminately destroyed whenever occasion offers, really rank among his best friends, and with few exceptions should be preserved and encouraged to take up their abode in the neighborhood of his home.

"Only six of the 73 species and sub-species of hawks and owls of the United States are injurious. Of these, three are so extremely rare they need hardly be considered, and another (the Fish hawk) is only indirectly injurious, leaving but two (the Sharp-shinned and Cooper's hawks) that really need be taken into account as enemies to agriculture. Omitting the six species that feed largely on game and poultry, 2,212 stomachs were examined, of which 56 per cent. contained mice and other small mammals; 27 per cent. insects, and only three and one-half per cent. poultry or game birds. In view of these facts the folly of offering bounties for the destruction of hawks and owls, as has been done by several states, becomes apparent, and the importance of an accurate knowledge of the economic status of our common birds and mammals is overwhelmingly demonstrated." (Taken from Dr. Merriam's letter of transmittal to the Secretary of Agriculture, page 3).

There never was a greater evil than the hawk and owl bounty (50c. each) in Ohio, Pennsylvania and some other states. This was paid indiscriminately for all kinds of hawks' and owls' heads, large or small, and we even know of the heads of cuckoos and other birds having been taken to the township clerk, who paid the customary fifty cents for them. The final effect was that rats and mice, especially field mice and meadow mice, so overran the country that we had to call for a repeal of the bounty law on hawks and owls. Of course, this cost the State a great deal of money; we know not how much, but in Pennsylvania, one county alone paid in one year over \$5,000 in bounties.

*(To be continued in Part 3.)*

## AMONG THE "EXCHANGES."

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We have been receiving so many excellent articles in our exchanges that as a matter of justice to them and to our readers we feel like reproducing a few here, giving credit wherever possible.

FROM THE "REGISTER," HOLLIDAYSBURG, PA., JULY 15, 1903.

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### Let Them Stay Where God Put Them.

The following editorial, which recently appeared in the Cleveland Press, was read aloud in every school room in that city by order of the Cleveland Board of Education:

"The song birds of Ohio are to stay where God put them—in the woods and fields. He who notes even a sparrow in its fall has not forgotten even the little troubadours of the sunny skies. He has raised up an agency for their defense in their virgin sweetness, in their primal beauty and in that which gives them their beauty and sweetness both—their native liberty. There is at least one statutory law in which the hand of God is surely visible. And it is being righteously enforced. No longer—in northern Ohio, at least—will the hedges, trees and sky be robbed of their richest treasurers to adorn human vanity.

It is a baffling physiological question why a woman wants a bird on her hat. It is a confession carried aloft like a banner that she needs unnatural aid to make her beautiful. For the bird adorns the woman—no woman adorns a bird. To refined minds the woman is prettier without the bird; to all minds the bird is prettier without the woman. The bird on a woman's hat is a mark of murder, the most cruel and useless that the mind can conceive. And, it is even a mark of more than that. It is a constant reminder that the vanity of woman can ruthlessly throttle the sweetest music that ever kissed the soul, enslave the most perfect type of freedom, mar the purest thing of beauty in the world, and then place the evidence



of her heartless crimes above her brow and ask us to look and think her more beautiful.

"Is it then to be wondered at that humanity has sickened of it and has said through the law and game wardens, that the song birds shall stay where God put them—in the fields and woods?

There in their native element the song birds are man's first and holiest inspiration. They taught him his first note in music, and gave him his first dream of liberty. They are the greatest optimists in the world, teaching always cheer and hope. They croak no melancholy dirges, but sing only the song of love, joy and praise. They bring into the heart of man naught but brightness and take from it naught but gloom.

Near to Nature's heart, where men and women have souls, the song birds suggest all that is best in life or to be longed for in eternity. They whisper to the child its first message from the Infinite, and carol to old age of glories beyond the vale. From dawn to night, from birth to death, they flood our days and lives with melody, and cheer with inspiration.

And let them stay where God put them—in the fields and woods, and in human souls."

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FROM THE "DOYLESTOWN DAILY INTELLIGENCER," SEPT.  
17, 1903.

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Depredators on Farms—Increase of Insects Which Cause Heavy Losses—Friends of the Farmer Need Careful Protection—Destruction of Birds and Certain Animals for Sport Permits Enemies to Destroy Crops.

The great increase of insect pests in orchards and gardens entails an enormous expense upon the farmers of this country, and yet it is possible that the farmer himself is at fault to a certain extent by assisting in the destruction of animals and birds that would perform for him valuable service if permitted. Beasts and birds of prey are sufficient to prevent any alarming increase of the birds that are capable of doing harm, but nearly all birds are carnivorous to some extent, as they can subsist on animal food. Birds prey upon worms, and the natural increase of all kinds of insects would soon render the earth uninhabitable by man but for the assistance

given him by the creatures which he so ruthlessly destroys without regard to future consequences. The carnivorous animals and birds do not increase as rapidly as the kinds upon which they prey, and a single lion or tiger may serve to prevent a district from being overrun with graminivorous animals. If such conditions did not exist the result would be famine. As the forests are cleared the destructive animals and birds are driven away or restricted in their capacity to do harm, but man seems to become himself a beast of prey and wantonly destroys for the pleasure of so doing. He considers certain animals, such as the fox, hare, raccoon, opossum and mink, as "game," the hawk and owl being always regarded as his foes. He adopts the dog and cat, the latter being more destructive to birds than any other animal, as it is not only active and somewhat nocturnal in habit, but also climbs trees. The fox, opossum and raccoon are among the most useful animals known, as they seek their food where field mice and ground insects abound. The little damage done by them is not worthy of consideration compared with the service performed. The only apology for their destruction is the occasional loss of poultry, but no careful farmer will leave his poultry unprotected from danger at night.

#### Enemies of the Farmer.

The farmer has not yet discovered a method for preventing the destruction of his crops by field mice and insects, but he devotes more time to seeking the lives of his friends, the owl and hawk, than he gives to the insects which he cannot control. The damage to a portion of the corn and fruit by animals and birds is insignificant compared with the almost complete destruction of crops by insects. The mole, which ridges the earth, simply does so while destroying grubs, as moles consume them in large numbers. The quail, which is harmless, is forced by necessity in the fall and winter to search for food under every leaf and in every spot where an insect and worm can be found, during which time so spent they destroy thousands of insects, but in some localities the quail has been almost exterminated simply for sport, which is one of the most expensive luxuries enjoyed by man if he only knew it. The birds that remain over winter, or which do not leave until late in the fall, to appear early in winter, feed not only on insects, but on the seeds of many plants which the farmer does not desire in his field, and the reduction in the number of these birds is largely increased by cats, which feast upon the young in the nests in spring and which also destroy the eggs. This is a disturbance of the order of creation, and reduces the profits of the farmer while destroying the guardians of his crops.



The English sparrow in the country could be easily kept in check by the sparrow hawk and the well-known screech owl, the latter preying upon them at night and the former during the day, especially in winter, if the farmer would allow them; but on the approach of his natural friends he seizes a shotgun and puts an end to their usefulness, yet deploring the damage to his grain crop in the growing season, which he protects and allows to multiply without hindrance.

#### Protecting the Birds.

The subject most to be considered by farmers, at their meetings is not so much the destruction of insects and field mice as the protection of the birds that destroy the pests, and this protection should be extended to the owl and hawk, as well as to those animals which keep rabbits in check. The loss of poultry cannot happen if such birds are given the same care and attention as other stock, and if the farmer will consider the matter carefully he will notice that he loses but few chicks by the hawk compared with those appropriated by cats, yet he destroys the one and pets the other. A single dog in a community will do more damage to sheep in one night than all the wild animals in a year, but the losses to farmers from depredations of foxes are so small as to be hardly noticeable. The song birds that are said to be driven away by the English sparrow would return if the hawk and owl were unmolested, from the fact that the large majority of birds migrate, the sparrow remaining as food for the carnivorous birds, but the wildest sparrow is sufficiently wise to remain close to the haunts of men, where he is safe from his enemies. In winter no crops are growing, and there are but few, if any, small chicks. But little damage can be done the farmer by hawks, crows and owls at that season, while in summer they can secure food in abundance elsewhere, hence they should be given opportunities for keeping the sparrow within bounds.

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FROM THE PHOENIX "ADVERTISER," SEPT. 4, 1903.

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Noticing the myriads of insects that come to their death every night by means of the arc lights one is led to wonder whether the growers of crops in the vicinity of electric lighted towns would not find their labor of fighting insect foes materially lessened thereby.

The "Scientific American" of last week has an article pertinent to this, giving the results of a long series of experiments with "trap-lanterns," that is lanterns set in a pan of water coated with kerosene. Strange as it may seem, the vast majority of the victims caught by this means have been friends of the growers and not pests, which appear to have a happy faculty of escape. It is well known that the color and perfume of flowers are imperious calls to insects, certain species of which haunt certain flowers by day, and certain others like the moths are drawn to night blooms by the especial perfume. The article suggests that colored lanterns be used in testing this; whereas nearly all night-opening flowers are white, the evening primrose which opens in twilight being yellow. The red and blue flowers attract only day fliers, and it is not likely that red or blue lights would find them abroad at night. Powerful perfumes made in imitation of the natural odors of night flowers might show material results; but as a practical bait for insects would be barred by reason of their cost. The lesson of the article referred to is that instead of lending a helping hand to the farmer the arc lights are busy all night destroying those insects that keep his pests under control. It is unfortunate that this is so; but months of consecutive experiments with trap lanterns in skilled hands leave no other conclusion.

And spraying with Paris green works in the same way. It may be a necessity at times, to save a crop of fruit; but it costs the lives of friends as well as foes, and leaves the relative numbers of each undisturbed. What is wanted is a personal acquaintance with our friends, for the sake of the flower border and fruit garden as well as of the field crop, and then the discovery or invention of something that spares the former while exterminating the latter. So far, nothing has been found that will do the work of the insect-eating birds. They do not as a rule fancy the black, hard-shelled fast running beetles, which are insect eaters; and they do a world of good gathering up the soft grubs that feed on the leaves of growing plants. The harm the arc lights do make bird protection all the more important.

(N. B.—Spraying with Paris green rarely destroys beneficial insects, from the fact that the beneficial species are insect-eaters and do not get the poison on leaves as do the plant-eaters.—H. A. S.)



## FROM THE TEXAS "FARMER AND STOCKMAN."

## A Plea for the House Martin.

Several years ago we put up a couple of martin houses, each house having 14 rooms. Nearly every year all these rooms have a pair of these sweet warblers that rouse us from our morning slumbers with their merry chatter. When the young martins are hatched the parents make it lively for the bugs and worms. I enjoy watching them and talking to them. One black beauty (the male) will answer me with a chirp nearly every time I speak to him. One Sabbath afternoon I was sitting by the window and I saw that the martins were making constant visits to some small prune trees that were set out near the house. There were some three hundred that had been newly set out and the foliage was starting finely. After watching the birds awhile I concluded that I would go and see if I could find what they were after. I found the young trees were fairly alive with small army worms, enough to have destroyed nearly every tree if left alone, but the martins cleaned them out and saved us the trouble. Other orchards that did not have any bird protection were entirely denuded of foliage. The martins are valuable not only to the fruit grower and the farmer, but to the poultry raisers as well, as the hawks dare not swoop down on the young chicks for fear the martins will swoop down on the hawks. Where so many martins are congregated the hawks make themselves scarce. We could hardly raise half of the chicks we hatched for the hawks, as our home is in a stone's throw of the woods and the hawks had a good chance. But since we have the martins we seldom lose a chick by hawks, have not lost one this season. I have often watched them chase a hawk, and he will do his best to make distance as great as possible when three or four angry martins take up the chase. If they are not too far off you can hear the sharp crack of their beaks as with angry chirps they make a dart at the enemy. Put up more houses, the more the better.

I have only one objection to these houses and that is the English sparrows take possession of the houses as soon as the martins leave in the fall, where they hold full sway until the martins return. Then the sparrows are ordered to move out at once or be forcibly ejected. They move into the cave troughs and proceed to keep house there and give no end of trouble by clogging up the spouting with litter.

If women want to wear birds I think some manufacturer would make a fortune and earn the everlasting gratitude of the American people if he could start the fashion for women to wear English sparrows. I'd think they could be dyed and colored to suit the taste of any one even if the ornithologist could not recognize in the gayly colored red, blue or brown that it had once been a miserable little sparrow. While I myself would not wear a bird or a feather that cost the life of a bird I will not object to anyone wearing a sparrow colored or uncolored. As I watch the little scamps snap off the fruit buds from the peach and prune trees and then drop them to the ground I think what a pity that the man who brought them here hadn't sunk to the bottom of the sea and the sparrows with him.

Mrs. S. W. Burlingame.

Noble county, O.

## FROM THE PRESS CIRCULAR OF THE DEPARTMENT OF ZOOLOGY OF THE PENNSYLVANIA STATE COLLEGE.

## Winter Insect Remedies.

Most persons are likely to think of insect remedies as consisting chiefly of the direct application of insecticides, but this is erroneous. Just as contagious diseases often fail to afflict those persons who are most sanitary in their habits, so are insect attacks generally unknown upon the premises of most persons who take certain preventative precautions before the pests themselves appear.

Winter time measures against insects may at first appear to be unusual, but it must be remembered that it is then that the pests are unable to escape, if found, and also at that time vegetation is in its winter condition and consequently more resistant to the effects of unusually strong insecticides which must then be applied in order to be most effective. It is necessary to kill the insects without injuring the vegetation they infest. Certain plants, such as the peach, are so delicate that during the growing season they are injured by almost any kind of application that would be severe enough to kill certain kinds of the insect pests, such as the scales. During the winter time, when the leaves are off, the plants are much more resistant than are even the scale insects, and more ef-



fective remedies can consequently be applied at this time. Also, it is now that we can reach the eggs and chrysalids of certain kinds of insects that could not readily be destroyed at other times. For example, the immature of the codlin moth are now under the loose scales of bark around the trunks of the fruit trees, and the eggs of the apple Aphis or plant louse are to be found by the millions on the twigs of almost every apple tree. At this time of year we can safely use a spray of kerosene and water, of any desired strength, or even pure kerosene. One of the best remedies for scale insects and plant louse eggs is to spray on a calm winter day with pure kerosene, covering the tree with a very fine film, but not letting it run in streams then setting fire to it. It is said to burn just enough to kill the scales and eggs and not injure the tree. Another first class remedy for these pests is to wash or spray the trees well with a strong suds of caustic whale oil soap, two pounds of soap to one gallon of water. This will kill scales on rose bushes and elsewhere, but it must be thoroughly applied, and used when there is no foliage.

At this time of the year scrape the trunk of trees and burn the scrapings, thus destroying the larvæ of codlin moths. On a day when the fallen leaves are dry rake them up and burn them, thus killing dozens of different kinds of hibernating insects; but be sure first to save the toads that may be hibernating there and put them in a safe place for the remainder of the winter, for these animals are very useful about the premises. It is quite important to burn the last vestige of every plant that remains in the garden and truck patch, for the insects that will infest next year's crop are now lurking in the old cabbage stalks and leaves, the remains of potato, melon and squash vines, and under any and all debris in which they can find concealment. Board piles, brush heaps, and corners of rail fences are favorite places for hibernating insects. Clean up now and save next year's crops.

#### The Birds of the Winter Time.

Certain small birds that remain with us during the winter time are of very great value, although their economic effects are not generally known. Those birds are very beneficial for their destruction of both weed seeds and insects. Some, like the sparrows and horned larks, feed during the winter upon seeds alone, most of which are the seeds of weeds that are more or less obnoxious; others, like the quail, feed upon both seeds and insects, and some feed upon insects alone, even during the winter, when it is popularly

thought that no insects are to be found. It is to these and the necessity of preserving them that we wish to call especial attention at this time.

Two very important small birds that remain with us all winter and feed entirely upon insects, especially in orchards, are the Downy and Hairy woodpeckers. Members of this family can be known by their dipping flight, their short, sharp notes, their sharp rigid tail feathers pressed against the tree for support, two toes in front and two behind insuring a firmer grasp, their hard pecking against wood, their modest white and black colors, and the patch of red on the head of the male. They are found mostly on the trunks and larger limbs of the trees, head upward, searching for grubs, chrysalids, etc. They are erroneously called "Sapsuckers," and are killed through ignorance of their own value. They do not suck sap, and do not injure the trees. Protect the small woodpeckers of the winter time and thus protect your fruit crops.

Two other valuable winter birds are the two species of nuthatches. These can be known by their drab and grayish colors, no red, the call which is a nasal "pank," and their alighting on the trunks and larger branches of trees, mostly head downward. They do not peck into wood, as do the woodpeckers, but they pry into every crack and crevice and under every possible scale of bark in search of insects of any and all kinds and stages, and will freely eat eggs, such as those of the pear tree *Psylla*, Apple Aphids, etc., larvæ such as hibernate beneath loose bark, pupæ or chrysalids of all kinds of insects that are to be found in cracks and under bark, and adults or mature insects that are hibernating. For the extraction of such pests these nuthatches have bills that are especially long, slender, straight and pointed.

Mr. Mann, a well-known pear grower, near Rochester, N. Y., told the writer that one year the pear tree *Psylla* had destroyed his entire pear crop, amounting to thousands of dollars in value, and the eggs of the insects were so numerous in the fall that he thought there were no prospects of a crop the following year, but the nuthatches, both species, worked in flocks in his orchard all winter, and in the spring he could scarcely find an insect left. The birds of this one species had saved him thousands of dollars in one winter. These birds are also often mistaken for the so-called sap-sucker and ignorantly killed. Is it any wonder that we advise all fruit growers and others to preserve their birds?

Another remarkable valuable bird of the winter time is the common Chickadee. It can be known by its small size, black cap on its head, bluish gray back, and lighter under side, and especially by the fact that it generally alights on the twigs of trees and



swings head downward and every way, while clinging with its feet, like a veritable acrobat. It lives altogether upon insects, and eats an immense number of them. Its chief food consisting of the eggs of plant lice, small chrysalids, etc. A study of its stomach contents has proven beyond a doubt that it is one of the most valuable birds known to the farmer and fruit grower.

The brown Creeper also often occurs in our orchards during the winter. It is a small bird, slightly larger than the Chickadee, with a very long, slender, curved bill, with which it extracts insects of all kinds and in all stages from their winter hiding places where none but an expert entomologist would think to find them. It is one of the few kinds of birds with stiff and pointed tail feathers upon which it rests at times, as upon a third leg. All of these birds can be aided by putting fat meat, suet or trimmings from butcherings in trees for them. Place bands of tin around the trees and cats and squirrels will not get the food put up for the birds, which are our most useful allies.

For quails it is necessary, while there is prolonged snow, to feed them by setting sheaves of unthreshed grain of any kind in brush piles and scattering straws with grain in the head over brush so the falling snow will not cover it. If this be not done most of the quails in this State are likely to die of starvation.—H. A. S., State College, Pa.

PENNSYLVANIA DEPARTMENT OF AGRICULTURE.

DIVISION OF ZOOLOGY.

THE ZOOLOGICAL QUARTERLY BULLETIN,

(Commenced in May, 1903, as the Zoological Circular.)

Vol. I, No. 4.

THE ECONOMIC VALUE

OF

OUR NATIVE BIRDS.

DISCUSSED BY ORDERS AND FAMILIES.

ORDER VIII. RAPTORES: THE BIRDS OF PREY. (CONCLUDED.)

FAMILY 13. STRIGIDÆ: THE BARN OWLS.

FAMILY 14. BUBONIDÆ: THE OWLS.

(To be continued in future parts.)

(Sent free upon Application. Back Numbers sent upon Request.)

BY H. A. SURFACE, M. S., *Economic Zoologist.*

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### ACKNOWLEDGMENT.

Through the kindness of the Division of Biological Survey of the United States Department of Agriculture, and the interest and aid of Secretary Critchfield, we have found it possible to procure the excellent illustrations used in this Bulletin, at a cost of less than fifty cents per plate. Therefore in reproducing these illustrations from the publications of the United States Department of Agriculture we wish to make proper acknowledgment for the favor which is thus rendered to our readers. We should be glad to illustrate every species of bird mentioned, but there is a limit to the slight expense that may be incurred for this purpose.

H. A. S.

## NOTES ON OUR NATIVE OWLS.

In our last issue of the Zoological Quarterly Bulletin we discussed the Economic Features of the Native Hawks of Pennsylvania, showing that there are but two species that are really destructive to poultry, and most of the others are a great benefit, as they prey upon mice and other small mammals, and reduce the number of these creatures that would destroy farm crops or gnaw trees and commit other depredations. It now remains for us to discuss the Owls of the Keystone State.

While the Hawks are known as the Diurnal Birds of prey, feeding only by daylight; the Owls are commonly known as the Nocturnal Birds of prey, because they feed mostly at night. When the shades lengthen at the waning of the day, and the Hawks can no longer see to take their prey, because of the failing light, the Owls are already active and may be seen sailing like sprites through the air in their noiseless flight. These birds are especially adapted by Nature for their nocturnal existence. Their feathers are the softest, or lightest and fluffiest known among our native birds. By this soft and delicate condition of the plumage the Owls are able to fly so noiselessly and lightly that they make no noise by so doing, and their prey is not apprised of their approach. Also, their ears are of enormous size and covered with feathers that may be raised to admit sound. However, the tufts of feathers upon the heads of certain owls, which are erroneously called ears, should not be mistaken for ears, or hearing organs. Any one can see the true ear, or ear orifice, of the Owls by turning back the feathers at the sides of the head. The third feature by which these birds are especially adapted to their nocturnal life is the very large eye with large pupils, which are perfectly adapted to gain vision in subdued light, although the bright glare of the sun admits so much light that these birds are by daylight more or less blinded. Concerning the vision of Owls, there are two popular erroneous beliefs. One is that these birds can see in absolute darkness. By actual test with different species we have proven this to be fallacious. Although they can see better after night, or in a very feeble light, no creature possesses an eye that can see in true darkness. The second error is the common belief that Owls can not see in daylight. When suddenly routed from dark corners they may act temporarily blinded, but all creatures can see more or less by daylight, and a few Owls hunt their food by day when the sky is clouded.



The following statements are based upon personal observations and study, as well as upon the many facts given by Dr. Fisher in his excellent Bulletin on "The Hawks and Owls of the United States in their Relation to Agriculture," published as a Bulletin of the U. S. Department of Agriculture. We make free quotations from the latter, by the kind permission of Dr. Fisher.

All Owls swallow their food whole or torn into fragments only small enough to be swallowed. The problem in Nature then is how to get rid of the indigestible fur and bones of the animals upon which these creatures live. This is done by a very interesting process. As with all carnivorous animals the digestion is rapid, the fleshy parts are soon digested, and the bones and fur or feathers are left. The hard parts are crowded together in a mass, and surrounded by a coating composed of the fur. This makes a little ball known as the pellet, and the birds eject or throw up this ingeniously-arranged indigestible ball of refuse material. These pellets are to be found abundantly where Owls and some Hawks reside and nest, and by a careful study of this ejected material scientists are able to recognize the various kinds of creatures that have been taken as food. As a consequence, the real value of Owls is now definitely understood.

There are two interesting facts about the eggs of Owls. As with the other predaceous birds the number of eggs and young depends upon the amount of food to be obtained during the nesting season. For example, it has been shown that when the mice were most numerous and destructive in England, the number of eggs and young which the Owls and Hawks reared was almost twice the number reared by the same species during times when their natural food was more scarce. This is one of Nature's so-called means of holding the balance of Nature and preventing certain kinds of creatures from increasing in such numbers as to make it impossible for others to live upon the earth.

The other interesting feature in the laying and hatching of most Owls is that they commence to incubate or set very soon after laying the first egg, and continue the process of incubating, while the egg-laying is also continued. The eggs are not laid upon consecutive days, but after the lapse of certain brief intervals of time. This results in the first egg being hatched much earlier than are the eggs laid later, and consequently in the condition that is often seen in an Owl's nest where the young are of different sizes, and quite evidently vary in age. This peculiarity of simultaneous laying and incubating among the Owls has two advantageous results: (1) After the earlier birds hatch their bodies maintain heat which keeps the other eggs from becoming chilled and addled while the parents are searching for food. (2) In the northern regions where food is

scarce it would be impossible for the parent birds to find live creatures enough to maintain the rapid digestion and feed the gnawing hunger of a large number of birds at the same time, especially at the time the latter would be about large enough to leave the nest. By this singular means of prolonged incubation all the young do not need to be fed at the same time, and many of the older members of the family are already seeking food for themselves, while the younger are still in the nest. They are permitted to do this while the young members are still demanding the attention of the parents.

### FAMILY 13. STRIGIDÆ. THE BARN OWLS.

The Barn Owls are found commonly in the tropical and sub-tropical regions, and are among the few Owls which reside in our State that had their origin in the south rather than in the north. **The American Barn Owl (*Strix partincola*)** (A. O. U. No. 365), is so called because it closely resembles the European species, which so commonly nests in barns and is found at times in various places, as castles, ruins, outbuildings and other structures. The common name is more or less misleading in this country, because although the bird may be found at times in barns, they have a preference for towers, crags, ruins, outside buildings, trees, etc. This bird is from fifteen to twenty inches long, and has a spread of wings of about forty-five inches. It is tawny yellow above, and more or less margled with white or ashy, speckled with black and other dark bands upon the wings and tail. Beneath, the color varies from a silky white to bright tawny, while it is spotted with black spots. On the legs the feathers are very short and hair-like. The eyes are smaller than in the other Owls, and dark in color. The disk of the face is not a circle, but nearly triangular, with the point beneath the chin. The wings are long, and when folded reach beyond the tail, which is about half the length of the former. This bird is peculiar in the fact that there is to be found on the inner side of the middle claw of each foot a comb-like edge, similar to that possessed by herons and night-hawks.

The Barn Owl is common at the southern portion of the United States and Mexico, and gradually decreases in abundance until the southern boundary of Canada is reached, north of which it is very rarely seen. It is not common in the northern portion of Pennsylvania, but occurs more or less in the southern portion. That this bird is rare is shown by the fact that last fall one of the daily papers of Philadelphia published its photograph, with the statement that the naturalists to whom it was shown did not know its



name. Its face so much resembles that of a monkey that it is sometimes called the "Monkey-Faced Owl," and it is this bird that has doubtless given rise to the prevalent and erroneous idea that in the Everglades of Florida are to be found birds with monkeys' heads. It migrates southward in winter in our State, but from Maryland southward it is not to be called a regular migrant. It has two notes, one a short shriek, and the other has been described as a "snore." We have often seen it sitting on the tops of buildings or trees, watching for its prey in the twilight, while in the day time it is to be found perching in some dark corner. In the states where it is more abundant, it is often found in colonies.

In this State these birds nest in April and May. The nest may be placed in the belfry or tower of a building, or on the beam of a barn, in a hole in a hillside, among crags, or often in hollow trees. In California, we frequently found it in the last-named situation. The nesting material varies from nothing but a few feathers from the parent bird to a mass of rubbish which it may collect. Its pellets are common around its nesting site. The number of eggs varies from four to seven, according to the abundance of food, as with other raptorial birds.

"The period of incubation is from three to three and one-half weeks. As a bird will occasionally begin to set soon after the first egg is deposited and as eggs are laid on alternate days, the last one will not hatch until two weeks after the first. This habit accounts for the difference in size in individuals of the same family. When the cavity containing the nest is large enough both birds usually occupy it."—Fisher.

Ornithologists have had great opportunities to study carefully the food of the Barn Owl, since it nests near the abode of man and often where its ejected food pellets can be found and carefully examined.

All testimony goes to show that the Barn Owl is one of the most beneficial of rapacious birds. Audubon says of the American species: "After long observation, I am satisfied that our bird feeds entirely on the smaller species of quadrupeds, for I have never found any portion of birds about their nests, not even the remains of a single feather in the pellets which they regurgitate, and which are always formed of the bones and hair of quadrupeds."

Mr. W. B. Tegetmeir, in an article on the Barn Owl, says: "The utility of the owl is illustrated by Lord Lilford with a very amusing anecdote. He states that when he was a schoolboy he had a half-grown barn owl that he regaled on one occasion with as many mice as it would swallow. Eight in quick succession disappeared down the capacious gullet of the owl, the ninth followed all but the tail, which for some time hung out of the mouth of the bird, but the

quick digestion of these raptors is well illustrated by the fact that in three hours the owl was ready for a second meal, and took four additional mice.

"If this is the performance of a single bird, the effect that the feeding of nests of six or seven young would have would have on the number of rats and mice in a district is self-evident. Lord Lilford says that he has seen a pair of Barn Owls bring food to their nests no less than seventeen times within half an hour. This rate, if continued for only four hours out of the twenty-four, would give (if we include the animals eaten by the old birds themselves) more than 150 'rats and mice and such small deer' destroyed daily for the support of one nest of owls. Is it surprising that vermin abound where their natural enemies have been exterminated by farmers, gamekeepers and plumassiers?"

Prof. B. W. Evermann, who has had considerable experience with this bird in California, writes of its food as follows:

"Their food consists principally of the gopher (*Thomomys talpoides bulbivorus*) and the California ground squirrel (*Spermophilus grammurus beecheyi*), both of which are so destructive to growing crops and fruit trees on the Pacific coast. Other small mammals, particularly rabbits, birds and insects go to make up its bill of fare.

"This owl is not large, yet it must be a very strong and courageous bird, as evinced by the fact that I have often found in its burrows portions of the large jackass hare (*Lepus californicus*) or 'narrow-gauged mule,' as popularly known in California."

"In the East its food consists largely of mice and rats, which it destroys with as much energy as it does the gophers in the West. All the common species, including the meadow, house, and white-footed mice, as well as the common rat, are eaten with equal relish."—Fisher.

The following extract from an article by Charles Dury is interesting not only in showing to what extent the Barn Owl feeds on rats, but also in pointing out its amicable relations with the domesticated pigeons:

"On October 15 I received two specimens of Barn Owls, male and female, that had been killed near Jones' Station. In the stomach of one was a mouse, and in the other was an orthopterous insect, commonly called "Katydid" (*Cyrtophyllus concavus*). October 16, Mr. Clifford Allen went to the town hall and placed a ladder up to the tower and climbed up there. There were four owls on a beam looking down at him, and one of these he shot. In this specimen, which was a female, was a nearly grown rat, from which the head had been bitten and the body swallowed entire. Mr. Allen



closed the trap-door leading to the tower, and on the 18th I went to Glendale to examine the place. When Mr. Allen went up four owls flew out, one of which was killed, a female. The stomach contained two mice. On going up into the tower I was astonished at the sight presented. The floor and ledges were covered with the cast-up pellets of the birds. It is well known to ornithologists that raptorial birds swallow much indigestible matter, which is formed into balls in the stomach and afterwards cast up. These are called pellets. In this case they were by hundreds, and covered the floor several inches deep in places. I examined many of them, and found them made up entirely of the hair and bones of the smaller rodents, mostly mice. There must have been the debris of several thousand mice and rats. But the strangest part of the curious habitation was the flock of domestic pigeons that were living seemingly on intimate terms with the owls and, judging from the old pigeon nests, I presume the pigeons had actually nested and reared young there. This seems to show the food of this owl to be almost exclusively mice and rats, and proves to be a species of the greatest economic value.—Fisher.

The following in relation to the food of a family of owls found in a church steeple on Long Island is given by Mr. William Dutcher: "The floor on which they were was in a filthy condition, covered with pellets, and dead rats and mice in all stages of decomposition. There were also one young muskrat and some moles."—Fisher.

During the summer of 1890 a pair of Barn Owls occupied one of the towers of the Smithsonian building in the city of Washington, where they reared seven young. On June 28, the writer ascended to their home and found the young more than half-grown. The floor was strewn with pellets, and the nest, which was in one corner, was composed of a mass of broken-down ones. An examination of 200 pellets gave a total of 454 skulls. Of these 225 were meadow mice; 2 pine mice; 179 house mice; 20 rats; 6 jumping mice; 20 shrews; 1 star-nose mole, and 1 vesper swallow (*Poocætes gramineus*).

Among other mammals on which it feeds more or less commonly, may be mentioned bats, shrews and moles. Dr. Bernard Altum, a number of years ago, examined 703 pellets disgorged by this species, and found a total of 2,551 skulls. Of these, 16 were bats; 3 rats; 930 mice; 1,579 shrews; 1 mole; 19 English sparrows, and 3 other birds.

On examination of 39 stomachs of these birds it was shown that only 3 had eaten other birds; 17 had eaten 37 mice; 17 had eaten other mammals; 4 had eaten 16 insects, and 7 were empty. The insects were mostly locusts and grasshoppers. Among the birds that

this has been known to eat are the Cowbird, the English sparrow, the Grass Sparrow, and the Towhee; and only one pigeon, but no other poultry or game bird. Among the mammals eaten by the Barn Owl are the different species of mice, rats, shrews, moles, muskrats, etc. This shows the undoubted value of the Barn Owl, as well as the fact that it is not obnoxious or destructive in its feeding habits.

#### FAMILY 14. BUBONIDÆ. THE TRUE OWLS.

##### The Long-eared Owl (*Asio wilsonianus*.) (A. O. U. 366.)

This valuable bird is intermediate in size between the common Great Horned Owl and the little Screech Owl. It takes its common name from the conspicuous tufts of feathers, erroneously called ears, which it can erect over its head. These contain eight or ten feathers, and are about as long as the middle toe with the claw. This bird is tawny above, while below it is grayish white with streaks and bars of brown, black and tawny, while the feet and legs are tawny and unspotted. It is from thirteen to sixteen inches long, and has a spread of wings of about thirty-nine inches.

This bird is found from Nova Scotia to Florida along the eastern portion of the United States, and from the Atlantic to the Pacific. It breeds throughout this range and generally houses itself in the remodeled nest of a hawk, crow, heron or squirrel. It rarely nests in hollow trees, and in the west may even breed in the steep cliffs along streams. It lays from three to six eggs, from the latter part of March to the middle of April. The male stays near the nest occupied by the female, and aids in capturing food.

The Long-eared Owl is strictly nocturnal in its habits, as is the common little Screech Owl, and differs in this regard from the Short-eared Owl, and a few others that may hunt in the day time. While a few may be found in our State during the winter, it generally migrates southward at this season. Sometimes several birds may be found in a colony or group.

"Although quiet during the day, and apparently indisposed to venture into the strong light, when started it is able to thread its way rapidly through the most intricate passages and to evade obstructions, demonstrating that its vision is in no way defective. The bird is not wild, and will allow itself to be closely approached. When conscious that its presence is recognized it sits upright, draws the feathers close to the body and erects the ear tufts, resembling in appearance a piece of weather-beaten bark more than a bird. It makes a very gentle and interesting pet, and will afford



great amusement by its antics. An individual which the writer once had would allow itself to be dressed in a doll's hood and shawl by the children. When too roughly handled it would fly to the top of the door, though in a few minutes it would return to them and appear to be interested in all the details of their play.

"Like the other Owls, its flight is slow and wavering, but in common with them it is buoyant and devoid of any appearance of heaviness. The note of this Owl is said by some to resemble the noise made by kittens, while others state it is like the barking of small dogs."—Fisher.

Various authors have testified to the value of this bird as follows:

"It preys chiefly on quadrupeds of the genus *Arvicola* and in summer destroys many beetles."—Audubon.

"Besides mice and rats this species also preys on field mice, moles and beetles."—Nuttall.

"Their food consists almost exclusively of field mice, which they kill vast numbers, a fact which should earn them the protection of the farmer."—Henshaw.

"The stomach of one specimen of the Long-eared Owl in the collection contained the skulls and bones of at least 8 field mice, and therefore, when about barns and graneries, these birds must be very useful."—Glover.

"Their food consists principally of mice and the smaller rodents."—Bendire.

The Long-eared Owl is one of our most beneficial species, destroying vast numbers of injurious rodents and seldom touching insectivorous birds. The birds killed by it are mostly seed-eating species, which do not benefit the agriculturist to any great extent. As this Owl is readily destroyed, it is the one that suffers most when short-sighted legislators enact laws for the destruction of birds of prey."—Fisher.

Of 107 stomachs of these birds that were examined by Dr. Fisher or others, 15 were found empty; only 1 contained a game bird (quail); 15 contained other birds, mostly sparrows of different kinds; 84 contained mice; 5 contained other mammals; and 1 contained insects. The 84 stomachs in which mice were found contained a total of 159 of these injurious rodents. The mammals eaten by this owl are mostly mice of different species, but occasionally squirrels and rabbits are taken and sometimes shrews. It is thus proven that this bird is of great benefit on the farm, in the orchard, and around the premises. It is not known to destroy domesticated fowls or chickens, and a law placing a bounty upon the owl—a price upon its scalp—would be unjust to the bird and detrimental to the interests of man.

### The Short-eared Owl (*Asio accipitrinus*.) (A. O. U. 367.)

This is also called the Marsh Owl, or Swamp Owl, from the fact that in this State it is often seen in the lowlands hunting for mice during the day time. It is found over the greater portion of the entire earth, except Australia, although during the summer with us it is rare, as it then dwells north of our State. In the fall great numbers of these birds pass to the southward working over the low meadows, and gathering their food by day, as they go. It is not an uncommon thing to see them fly up, as one crosses such a field during the latter part of autumn. Ten or a dozen may be found on the ground searching the grass for their food, although they do not live in flocks, but scattered over the fields some rods apart. The common name is given to them because of the so-called ear tufts, which are very short and inconspicuous, being much shorter than the middle toe with the claw. The color of the bird varies from bright tawny to buffy white, with conspicuous large brown stripes. The feathers toward the centre of the disk immediately around the eye are black. The eyes themselves are dark and not as large as in the other kinds of Owls. The bird is from 13 to 17 inches in length, and has a spread of wings of about 43 inches.

The nest is composed of a rough, loose pile of coarse grass and sticks drawn together on the ground, and lightly lined with fine material and feathers. It is often in a depression under a bush or high grass. There are from three to five eggs, deposited from April to May. This is pre-eminently a bird of the swampy country, preferring the marshes and excellent covering formed by the bushes and high grass. In the United States it is more common in the winter, receiving large reinforcements from the north. In this season either single individuals are met, or small colonies are sometimes found. Rarely large colonies of hundreds have been known.

In a northerly direction it reaches the southern part of the Arctic regions at about the 69th parallel, whence southward it probably breeds more or less commonly in favorable localities throughout its range, though as a summer resident it is rare in most parts of the eastern United States.

"The food of this Owl consists largely of mice and other small mammals. A number of species of insects, birds and reptiles also may be mentioned as occasionally contributing to its fare. Fully 75 per cent. of the stomachs examined in the Department of Agriculture contained mice. The remains of as many as six of these little mammals were found in one stomach, and several contained three or four each."—Fisher.



Of the other mammals upon which this Owl feeds may be mentioned shrews, gophers, and sometimes small rabbits. Shrews are not uncommon in the stomach contents. Dr. J. C. Merrill, in mentioning the food of this bird at Fort Klamath, Oregon, says: "In one specimen a pellet ready for regurgitation contained ten nearly perfect skulls of a shrew, a species of which, and field mice, were nearly always found in the stomachs."

"It does not feed as extensively on insects as either the Barred or Screech Owls, but there are reports enough on the subject to show that grasshoppers, crickets and beetles at times form a considerable part of its food. It is quite exceptional for this Owl to feed upon birds. Out of ninety stomachs examined by us at the Department, ten contained bird remains."—Fisher.

"Undoubtedly field mice, and especially those of the short-tailed group or voles, are their chief objects of prey, and when these animals increase in an extraordinary and unaccountable way, as they sometimes do, so as to become extremely mischievous, owls, particularly of this species, flock to devour them. Thus there are records of 'a sore plague of strange mice' in Kent and Essex in the year 1580 or 1581, and again in the country last mentioned in 1648. In 1754 the same thing is said to have occurred at Hilgay, near Downham Market, in Norfolk, while within the present century, the Forest of Dean, in Gloucestershire, and some parts of Scotland have been similarly infested. In all these cases owls are mentioned as thronging to the spot and rendering the greatest service in extirpating the pests. The like has also been observed in Scandinavia during the wonderful irruptions of lemmings and other small rodents to which some districts are liable, and it would appear that the Short-eared Owl is the species which plays a principal part in getting rid of the destructive horde. An additional fact of some interest was noticed by Wolley, namely, that under such circumstances the owls seem to become more prolific than usual."—Fisher.

Of 110 stomachs examined at Washington, 11 were found to have eaten small birds, 77 had destroyed mice, 7 had eaten other mammals, and 7 contained insects, while 14 were empty. None had eaten poultry or game birds. The 77 which had eaten mice contained a total of 103 of these destructive rodents. Among the birds eaten were the red-winged black bird, certain sparrows, the English sparrow and robin. Among the mammals were mice, shrews, rats, etc.

### The Barred Owl (*Syrnium nebulosum*.) (A. O. U. 368.)

This bird is also sometimes called the Hoot Owl and the Rain Owl. It is distinguished from the other Owls by its large size, the yellow color of its bill, the dark eyes and dark bars or marks across its breast. It is of a grayish color, and the cross bars on its breast are dark. While the preceding bird is a northern species, this one is southern. It is found in Pennsylvania throughout the year, and is common through the wooded regions of the State, especially where there is much large timber. It flies by early twilight and at night, and nests in the hollow trees or the old nests of larger birds, or sometimes building its own nest among the branches of trees. In this State it nests in March and April, or sometimes a little later. It lays two or three eggs which are white and about two inches long and one and three-fourths inches in diameter. They remain concealed during the day time in the deep, darker portions of woods, although they occasionally hunt food during a clouded day as well as by twilight.

They have no ear tufts, and the general color is grayish brown and buffy white. The length is 19 to 24 inches, and they have a spread of wings of about 46 inches. This is one of the Owls that occasionally devours poultry, and consequently has contributed toward bringing Hawks and Owls into general ill repute.

Relating to the food of this species, Audubon gives the following: "The Barred Owl is a great destroyer of poultry, particularly of chickens when half grown. It also secures mice, young hares, rabbits, and many species of small birds, but is especially fond of a kind of frog of a brown color very common in the woods of Louisiana. I have heard it asserted that this bird catches fish."

"Mr. Downes observed them to feed on hares, spruce and ruffed grouse, and other birds in Nova Scotia."—Nuttall.

"Their food is principally rabbits, squirrels, grouse, quails, rats, mice and frogs. From necessity as well as choice they not infrequently appear around the farmhouse and garden in quest of the poultry, particularly young chickens."—Nuttall.

"In Texas where the hens, turkeys, etc., roost on trees, this owl is very destructive. They do not kill old poultry, but like half-grown chickens, and soon depopulate a whole poultry yard."—Nehrling.

"It sometimes visits chicken roosts and causes great devastation, but its ordinary food consists of squirrels, rats, mice, and small birds."—Wheaton.

"To all this testimony, which could be increased by the addition of many other notes attesting the destructiveness of the species to



poultry and game, the investigations of the writer are in direct variance. Of the 109 stomachs examined four only contained the remains of poultry, and in one the trace of a game bird was found."—Fisher.

The following letter from Prof. Baird, published in the *Journal of the Cincinnati Society of Natural History* expresses a primary truth concerning the raptorial birds and carnivorous animals in general:

"Washington, April 10, 1882.

"Dear Sir: The destruction of hawks will save an occasional fowl, but will cause a great increase in the abundance of field-mice, rabbits, squirrels, snakes, frogs, etc., upon which the hawks feed.

"It has now been conclusively shown, I think, that hawks perform an important function in maintaining in good condition the stock of game birds, by capturing the weak and sickly, and thus preventing reproduction from unhealthy parents. One of the most plausible hypotheses explanatory of the occasional outbreaks of disease among the grouse of Scotland has been the extermination of these correctives, the disease being most virulent where the game keepers were most active in destroying what they considered vermin. It is my firm conviction that in the average of well-settled countries the hawks and owls are a benefit rather than the reverse in the community in general, and to the farmer in particular.

Yours respectfully,

SPENCER F. BAIRD."

Of 109 stomachs examined by Dr. Fisher, the following are the results: 5 contained poultry and game; 13 contained other birds of which 7 were Screech Owls; 46 contained mice; 18 had eaten other mammals; 1 had eaten a lizard, while 4 contained frogs. Fish were found in 2; insects in 14; spiders in 2; crawfish in 9, and 20 were empty. Among the mammals that were eaten were mostly mice and voles, but shrews, chipmunks, red squirrels, flying squirrels, rabbits and weasels were also found. Among the birds that were eaten were Screech Owls, Saw-Whet Owl, woodpecker and the fox sparrow, as well as the ruffed grouse and a few other small birds. Dr. Merriam took at least a dozen red-backed mice from the stomach of a single specimen of this kind killed near Moose River, in northern New York. This shows the great value of the Barrel Owl as a destroyer of the injurious little rodents. The bird is an expert fisher, and has been shown by Audubon and others to catch fish frequently.

"In summing up the facts relating to the food habits of this Owl it appears that, while the general statements of certain authors, especially the earlier ones, charge the bird with the destruction

of poultry, game and small birds, such destructive habits are comparatively uncommon. That it does occasionally make inroads upon the poultry yard and does more or less damage among game birds, is true; but the systematic collection and examination of a large number of stomachs show the exceptional character of such acts and reveal the fact that the larger part of its food consists of mammals. And it is to be noted that among the list are some of the most destructive rodents the farmer has to contend with. If a fair balance be struck, therefore, it must be considered that this Owl is on the whole beneficial, and hence should occupy a place on the list of birds to be protected."—Fisher.

#### The Saw-Whet Owl (*Nyctala acadica*.) (A. O. U. 372.)

This little Owl is at once distinguished from the other species by its very small size and the absence of ear tufts. It is variously known as the Acadian Owl, the Saw-Whet Owl and the Stone Owl. The last name is given to it because it is known occasionally to live among stones in a stone pile. It is called the Saw-Whet Owl because its note somewhat resembles the noise made in filing a saw. Thus, it would not be considered a very melodious song bird.

It is found in Pennsylvania during the entire year, but the southern border of this State is not far from the southern limit of range of this little bird, as it is a northern species. It is more common in the higher altitudes, and there nests in March and April.

"The eggs are generally deposited in the hollows of trees, the deserted burrows of woodpeckers being the favorite place, though open nests are sometimes used for the purpose. Mr. W. Perham, of Tyngsboro, Mass., was very successful in inducing this Owl to build in nests which he put up in various parts of the forest. These "nests" were sections of hollow limbs closed at the ends, with an entrance hole made in the side. As a rule this species uses no other material than the rotten chips found in the cavities, or such accidental material as has been dragged in by squirrels or mice."—Fisher.

It is the smallest Owl found east of the Mississippi River, and the total length from tip of bill to tip of tail is only seven to eight and one-half inches. It is brown above, more or less spotted, with white and light color beneath and striped with reddish brown. During the day it sleeps in hollow trees or among dark foliage or



in rocky places. It is not to be considered a common bird in this State. Its food is composed almost entirely of mice, especially those species living in fields near wood lands, although it has been known to eat rats, red squirrels, flying squirrels and chipmunks.

Of 22 stomachs examined by the Division of Biology of the United States Department of Agriculture, 17 contained mice, 1 a sparrow; 11 insects and 3 were empty.

"It also feeds to some extent on insects of various kinds. Thus it will be seen that while the diminutive size of the Saw-Whet limits its power of usefulness, its mode of life renders it a useful adjunct to the farmer, and, small though it be, yet in districts where it abounds the number of mice it annually destroys must be very large.

Mr. Brewster gives an interesting account of the operation of disgorging the pellets, which he observed in a young specimen in his possession: "The owl would gap several times, then the head would be violently shaken sideways, and finally the pellet, coated with mucous, would shoot forth, frequently falling several inches in front of the spot where the bird was sitting. After it was all over the little fellow assumed an expression of relief and contentment which was very comical."—Fisher.

#### **The Screech Owl (*Megascops asio*.) (A. O. U. 373.)**

This is the best known Owl in America, owing to its abundance and its habit of residing near the abode of man. It is found throughout the entire year in this State, and nests in all parts of the country. This little bird is known as the Screech Owl, the Mottled Owl, Gray Owl and Red Owl. It represents what is called dichroism, as it has the two-color phase. In the same nest some may be gray and others red. This difference is so great that one would readily take specimens of the different colors to be birds of different species, yet this does not depend upon age, sex or season. It is from six and one-half to ten inches long, with an extent of wings of from twenty to twenty-four inches.

The ear tufts are large and conspicuous, and a stripe is to be seen along each side of the back, and a blackish line along the shafts of the feathers. It is often found in buildings, but more frequently in hollow trees, especially in old apple trees.

"The low, wailing, moaning notes of this Owl are not loud, but their character enables them to be heard a considerable distance; they suggest, without resembling, those of the common dove. They may be heard at any time from dusk to dawn, and on rare occasions in the daytime."—Fisher.



Plate 1. Red-Tailed Hawk (*Buteo borealis*) carrying a vole or meadow mouse (*Microtus pennsylvanicus*). From the Year Book of the U. S. Department of Agriculture, for 1894. (From "Hawks and Owls from the Standpoint of the Farmer," by A. K. Fisher, M. D.)



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Plate 2. Sparrow Hawks (*Falco spaverius*). The one on the branch is the male, and the one on the stump is the female. From the Year Book of the U. S. Department of Agriculture, for 1894. (After Fisher.)



Plate 3. Barred Owl (*Syrnium nebulosum*). From the Year Book of the U. S. Department of Agriculture, for 1894. (By Fisher.)





Plate 4. Great Horned Owl (*Bubo virginianus*) with poultry. From the Year Book of the U. S. Department of Agriculture, for 1894. (By Fisher.)

This one is strictly nocturnal, or seldom flies by daylight unless forced from its diurnal retreat. The day time is spent in dark cavities of hollow trees where it avoids the attacks of various kinds of small birds. While the eggs are laid in the hollows of trees, no real nest is built, or no nest material is used. From three to six eggs are placed at the bottom of the cavity, generally during the month of April. Both the male and the female remain in the cavity during the period of incubation, if there be room for the two. They incubate about a month and the young remain in the nest about the same time.

Mr. O. B. Hark, of Bethlehem, Pa., wrote in "The Birds of Pennsylvania" as follows: "Have you ever heard of fixing holes for Sparrow Hawks and Screech Owls? Mr. John Mack, the best climber I ever met, every spring cleans out old holes, enlarges such as are too small, etc., and finds it pays him well; this spring he got ninety Sparrow Hawk eggs and every one was taken out of holes fixed by him; at one time he put the leg of an old rubber boot in a hollow tree and several weeks later took a batch of Screech Owl's eggs out of it. Another singular experience he had with Owls is, he made a hole in a willow tree; when he came to look after it again he found Owls had taken possession of it and had nearly filled it with field mice; he said there were enough mice in it to fill his derby hat. This happened just before a heavy rain storm and about ten days later every mouse was gone."

The result of the examination of 255 stomachs at Washington was as follows: One contained poultry; 1 had eaten a pigeon; 38 contained other birds, and in 91 mice were found; in 11 there were other mammals; in 2 there were lizards, while in 4 were batrachians. 1 had eaten fish, 100 had eaten insects; 5 contained spiders; 9 crawfish, and 7 were filled with miscellaneous material; 2 had eaten scorpions; 2 had eaten earth worms, and 43 were empty. Of the mammals that had been eaten the chief were mice, although flying squirrels, chipmunks, moles, etc., were also found. The 91 stomachs contained 118 mice, of which 24 were determined as being the house mouse, and many others may have been representatives of this very injurious species. This shows the value of the Screech Owl around the home. Of the birds, it had eaten its same kind, or the Screech Owl, and among the other species determined were the quail, lark, junco, native sparrows, English sparrow, water thrush and wren. Of the 138 containing small birds, 12 were found filled with English sparrows. This shows the value of the Screech Owl as a destroyer of this feathered pest of the villages and thickly-settled portions of the country.





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"Unfortunate as this bird-catching habit seems to be, it may be ranked as an important factor in the bird's favor. Since the introduction of the noxious English sparrow, and its alarming increase in our cities and villages, experience has taught the little Screech Owl that this sparrow is a delicate and easily obtainable food. Many times at dusk has this Owl been seen hovering about the ivy-mantled churches or thick shrubbery of the parks in search of sparrows, and still more positive evidence is furnished by the remains of English sparrows which have been found in the stomachs of Owls shot in such localities."—Fisher.

On this subject Mr. R. S. T. Russell, of Mount Perry, Ohio, writes as follows: "I want to send you a fact about the English sparrow. Last summer they were so thick around my house as to almost set me wild, when a little "Screech" Owl got to visiting us every night, and each visit he carried off a sparrow. My house is thickly covered with vines, and the owl would make a dash into the vines and capture his sparrow every time. By fall they were well thinned out."

"Their food consists of a great variety of animal life, including mammals, birds, reptiles, batrachians, fish, crustaceans, and insects. At night-fall they begin their rounds, inspecting the vicinity of farm-houses, barns, corncribs, making trips through the orchard and nurseries, gliding silently across the meadows or encircling the stacks of grain in search of mice and insects. Thousands upon thousands of mice of different kinds thus fall victims to their industry. Their economic relations therefore are of the greatest importance, particularly on account of the abundance of the species in many of the farming districts, and whoever destroys them through ignorance or prejudice should be severely condemned.

"Those who have rambled much in the country in the clear winter mornings must have noticed the tracks of mice which often form networks in the snow, crossing and recrossing, passing in and out of walls and stacks, or converging toward some choice bit of food—all tending to show how active these little rodents are during the night, a period when most of the world sleeps. Occasionally a track stops abruptly, and while the observer is trying to read more of the history written in the snow, his eyes catch the faint impression of a pair of wing tips near where the trail ends, and instantly he recognizes that a tragedy has been enacted. Beside the different species of mice, the Screech Owl feeds on other small mammals, such as chipmunks, shrews, moles and occasionally bats. During warm spells in winter it forages quite extensively and stores up in its home considerable quantities of food for use during inclement weather. It may be said in this connection that with one

exception the only specimens of pine mice procured by the writer in southern New York were taken from the storehouses of this Owl."—Fisher.

It is not uncommon that crawfish, frogs and fish have been found in its stomach and in the places where it has stored its food to provide for itself during a time of scarcity. During the fall when food is abundant this little bird will often catch several mice, frogs, or fish and store them in hollows of trees or similar places.

This was one of the valuable birds in destroying the grasshoppers of the west, and is yet one of our most valuable birds to feed upon grasshoppers, crickets and the night-flying insects, such as June bugs or May beetles. We have often found these insects in their stomachs.

"It preys on mice, small sparrows, etc., and very often catches nocturnal beetles and other insects. It thus destroys a large number of field mice and the large cockchafer, so injurious to our fruit trees. In winter it familiarly enters our barns and out-houses, where it becomes an expert and industrious mouser."—Michener.

"After dark it is all alive; not a mouse can stir without being observed, and so quick and noiseless is the flight of the bird that few escape which expose themselves."—McIlwraith.

"A large number of castings of this species were examined on various occasions, and found to be composed almost entirely of the fur and bones of Meadow and White-footed-mice; with feathers of the bluebird and some sparrow in several cases; and sometimes insects."—Moore.

Mr. George C. Jones, writing from Brookfield Centre, Fairfield county, Conn., says: "I think the smaller species of Owls feed upon the cutworm to some extent. I have found cutworms in the stomach of the common Screech Owl and in the Long-eared Owl. The fact that both the cutworms and the Owls are nocturnal leads me to believe that the owls, of all the birds, are the most efficient exterminators of this formidable pest and should on this account receive protection. The farmers here are large growers of tobacco, and the damage done by the cutworm to the young plants and the labor of resetting forced upon the growers is almost incalculable. I believe that if our native Owls were as plenty as some other species of birds the ravages of this destructive worm would be much less than at present."

Unfortunately we can not shut our eyes to the blacker pages of its history, and it must be said that occasionally it is destructive to small birds, especially during the breeding season, when it has a number of hungry mouths to fill, and also in suburban districts where its favorite food is hard to procure. Mr. Morris M. Green



found the remains of a house wren in a hole containing five young Screech Owls; and Nuttall says: "In the hollow stump of an apple tree, which contained a brood of these young owls, were found several bluebirds, blackbirds and song sparrows, intended as a supply."

"Sometimes it kills birds fully as large as itself. In one of its holes the writer once found the remains of a quail; and a woodcock has been mentioned as found in a similar situation. Mr. R. E. Kimball, of Fitchburg, Mass., informed the writer that a Screech Owl was killed at Lunenburg, near that place, January 27, 1890, which had killed thirteen doves for one farmer before it was itself executed. Its stomach was filled with the feathers of its last victim. In a few instances it has been known to kill and eat one of its own kind. When suffering from the pangs of hunger it occasionally attacks barn-yard fowls."—Fisher.

These facts should be enough to show us that the Screech Owl is worthy of preservation as a destroyer of insects, mice and English sparrows, and while it may occasionally take a small bird, it is not a destroyer of poultry, and upon the whole is far more beneficial than injurious to the interests of agriculturists

#### Great Horned Owl (*Bubo virginianus*.) (A. O. U. 375.)

This bird receives its common name from its large size and the conspicuous tuft-like "ears" or "horns" on its head. It is the name by which it is familiarly known in this State, although this is the species also most commonly known as the "Hoot Owl." It is the largest Owl that is a permanent resident of this State, being eighteen to twenty-five inches long, and having a spread of wings of from forty-nine to fifty-seven inches.

It is found throughout North America and is a permanent resident of all parts of Pennsylvania. In this State it is found nesting in the month of February, being the first or earliest of the Pennsylvania birds to commence nesting. While it occasionally builds its own nest, it more frequently remodels the old nest of some other large bird, such as the hawk or crow. It also occasionally nests in hollow trees. This habit is much more common in the South. There are usually two eggs, but there may be three or four, and they are about four weeks incubating. As with most other carnivorous birds the young grow slowly. They may remain in the nest as long as twelve weeks. This Owl lives in the woodland, especially where there are large trees, and flies about hunting for food on cloudy days as well as by night.

Of 127 stomachs examined at Washington 31 were found to contain poultry or game birds; 8 had eaten other birds; while 13 contained mice, and other mammals were found in 65. 1 contained a scorpion; 1 a fish; insects were found in 10, and 17 were empty. In 1 stomach alone there were found 11 mice and 4 shrews. Among the mammals that were eaten were a rabbit, various native rodents, such as different rats and mice, chipmunks, ground squirrels, gray squirrels the fox squirrel, musk rat, shrews, moles, bats, flying squirrels, etc. Among the birds found were the rail, quail, ruffed grouse, Cooper's hawk, junco, mocking bird, robin, lark, finch, Guinea fowl and other domesticated fowls. Among the insects were May beetles, grasshoppers and katydids. This shows what a wide range of food is enjoyed by this bird, and what a varied part it plays in the economic features of the biological world.

"In studying this Owl in relation to its food habits it will be perceived at a glance that a bird so powerful and voracious may at times be a source of great benefit, while at other times it may be the cause of great damage. Now, the serious inroads it makes on the tenants of the poultry yard, as well as the destruction of many game and song birds would seem to call for the total suppression of the species. Again, when engaged chiefly in the capture of injurious rodents, which threaten the very existence of the crops, it is the farmer's most valuable ally and consequently should be most carefully protected.

The food of this species is of great variety; birds and mammals as well as reptiles, fish, crustaceans, and insects contribute to its fare. Among the birds most often taken may be mentioned all kinds of poultry (including half-grown turkeys), grouse, quail, doves and wild ducks. Even hawks, crows and other owls do not escape the voracity of this tiger among birds, and the large hawks are among those attacked and eaten.

Of all the birds of prey, with the exception possibly of the Goshawk and Cooper's Hawk, the Great Horned Owl is the most destructive to poultry. All kinds of poultry seem to be taken, though when Guinea fowls and turkeys are obtainable it shows a preference for these. In sections of the country where it is common the inhabitants often complain bitterly of its ravages."—Fisher.

The following from the pen of Dr. P. R. Hoy, shows how destructive a single Owl may be: "The specimen in the collection of the academy was known to carry off from one farm, in the space of a month, not less than twenty-seven individuals of various kinds of poultry before it was shot."

Dr. C. Hart Merriam gives the following account of its depreda-



tions: "Indeed I have known one to kill and decapitate three turkeys and several hens in a single night, leaving the bodies uninjured and fit for the table. This preference for the heads of their victims is more or less common to all birds of prey, as is shown by the universal habit of eating this part first.

"The rabbit undoubtedly stands at the head of the list of the mammals most often fed upon by this owl. In fact its great love for the flesh of rabbits is one of this Owl's redeeming qualities. In some parts of the West, where the rabbits are so numerous that it is next to impossible to bring to maturity any large proportion of the crops, this Owl feeds on this destructive rodent almost to the exclusion of other food. The examination of a number of stomachs revealed the fact that even in the East, where rabbits are not so abundant, their remains constitute a fairly large proportion of the contents. The writer is of the belief that where rabbits are comparatively abundant the species under consideration rarely molests poultry, and is a prime factor in destroying these destructive rodents."—Fisher.

The Great Horned Owl has been often credited with being an expert ratter. The following extract from a letter from O. E. Niles to Charles Dury, of Cincinnati, furnishes very interesting and detailed information on the subject: "For many years I have personally known the value of our large Horned Owl as a 'ratter,' and will cite one instance in particular as proof. About eight years ago one of my men discovered a pair of owlets of the large-horned variety in an old sycamore stub near my stables on my farm, and concluded to capture them alive. With some risk to himself he succeeded in securing them, but not without a regular fight with the old ones, who gave him a few wounds. In the nest where he captured the young owls he noticed several full-grown Norway rats, with their skulls opened and the brains removed. On descending to the ground he also noticed the bodies of many rats around the tree, and out of curiosity counted them, and found the bodies of one hundred and thirteen rats, most of them full grown. They all appeared to simply have had their skulls opened and the brains removed; and, from their undecayed appearance, must all have been captured within the previous week or ten days."

While this Owl feeds occasionally upon such mammals as muskrats, woodchucks and opossums it is able to do so by means of its great strength, although the smaller Owls would be unable to take these mammals as their food. Yet it is only to a limited extent that the Great Horned Owls feeds upon the small mammals, such as mice, voles, shrews and moles. One remarkable feature of its food is the skunk. The Great Horned Owl is the chief enemy of

the skunk in our country, and in eating this nocturnal mammal it is destroying a creature that eats many insects, but is at the same time the chief enemy of the eggs and young of game birds and other birds that nest upon the ground.

We have knowledge of one that formed the habit of feeding at a trout reserve in New York. The keeper complained of the reduction in the number of his fishes, and this decrease continued although snow was upon the ground, and no tracks of mammals or other prowlers could be seen. He decided to watch in the day time, and in the morning he found the wing marks of one of these birds in the snow where it had swept down for its prey in the small stream. He set a trap for it, and the winged poacher was captured and identified.

It appears from the above statements that the Great Horned Owl and the Barred Owl are the two species of this family which have contributed to bring the Owls into ill repute for attacks upon the poultry yard. It is for each person to determine for himself what creatures are obnoxious upon his premises and to treat them accordingly. It will be seen that these birds may have different results according to the surroundings, and when one has formed the habit of visiting the poultry yard it may be to the economy of man to destroy it, but this does not indicate that it would be a wise policy to kill all Hawks and Owls or even destroy all those of any particular kind.

#### The Snowy Owl (*Nyctea nyctea*.) (A. O. U. 376)

This large and handsome Owl is to be known by its great size and white or gray plumage. It is a native of the Arctic regions, nesting in the northern portions of the earth in the summer and migrating southward in winter. It is thus found with us only in winter time, and also only during occasional periods. As with all birds that come to us from the North in the fall, its numbers vary greatly from year to year, and it may be very common one winter and not found here the next year. It is particularly to be found along the seashore, and at rare intervals may appear almost in flocks. This bird hunts by day as well as by night and is an expert fisher. It is the only one of the Hawks and Owls that is used for food by man, as it is highly relished by the Eskimo hunters.

Of 38 stomachs of the Snowy Owl examined by the Division of Biological Survey at Washington, none contained poultry; and only 2 had eaten any game birds; while 9 contained other birds; 47 mice and 5 rats were found in 18 stomachs; 2 contained other mammals,



and 12 were empty. One specimen shot in New York contained 8 meadow mice, and another from Manitoba contained 14 white-footed mice and 3 meadow mice. This shows the immense value of this bird as a destroyer of the small rodents of obnoxious varieties.

"In the far north, lemmings and Arvicoline mice furnish almost the exclusive food of this Owl in summer, but during the winter wanderings, when these mammals are not always obtainable, it takes what food it can get, such as fish, hares, muskrats, squirrels, rats, ptarmigans, ducks, or even offal."—Fisher.

Mr. Henry Seebohm says: "The lemming forms the Snowy Owl's chief food in the Far North, the range of both mammal and bird being generally the same; but other small rodents are taken, and it will sometimes attack Ptarmigan and Willow Grouse, or even the arctic hare. It is said occasionally to feed on fish."

"Of the ten or twelve specimens which Dr. Leonhard Stejneger secured on Bering Island all except one contained the remains of arvicoline mice. The largest number found in the stomach of one individual was six, but in another the stomach was spoken of as 'crammed with arvicolæ,' so that probably it contained at least ten or fifteen mice. The extent of the dependence of this Owl upon mice is shown by the very interesting fact relative to the recent increase of the Owl on Bering Island, which the latter author records. Prior to 1870 there were no mice, and very few Owls ever visited the island. About this date the house mouse (*Mus musculus*) was introduced from ships and the Red-backed Mouse (*Evotomys rutilus*) in some unknown way. Twelve years afterward he found the island swarming with mice and an abundance of resident Owls, affording a striking demonstration of the perfect workings of nature, for with the undue increase of any one species there occurs a corresponding increase of its natural enemies."—Fisher.

"The economic value of the Snowy Owl is limited, owing to the fact that it chiefly inhabits inhospitable regions where agriculture is impossible. Nevertheless, large numbers occasionally visit Canada and the United States, and it can not be doubted that during these visits its service to the agriculturist is beneficial. Mice and lemmings appear to be its chief dependence, and it takes them to the exclusion of all other food whenever it can get them. The number of useful birds it destroys is quite disproportionate to the number of injurious rodents to be credited to its account, and it is to be regretted that the snowy plumage of the bird and its showy appearance render it an object of pursuit for ornamental purposes."—Fisher.

## "EXTERMINATION OF NOXIOUS ANIMALS BY BOUNTIES."

FROM A U. S. BULLETIN.

BY T. S. PALMER, BIOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF AGRICULTURE,  
(Summary).

(1) Bounty legislation has existed in the United States for more than two centuries and a half, and has been thoroughly tested in most of the States and territories.

(2) Rewards have been paid (a) on large animals, such as wolves, coyotes, bears, and panthers; (b) on small mammals, particularly gophers, ground squirrels, and rabbits; (c) on a few birds, such as crows, English sparrows, hawks and owls.

(3) This legislation has probably involved an expenditure of over \$3,000,000 in the last quarter of the century, and the expense seems to be increasing instead of decreasing. Single laws have caused an outlay of nearly \$200,000 in less than two years, and it is safe to say that any act which carries a sufficiently high reward to insure its operation will cost from \$5,000 to \$20,000 per annum.

(4) Objections to the bounty system may be grouped under four main heads: (a) Expense, which is usually out of all proportion to the benefit gained, and may be greater than the county or State can afford; (b) impossibility of maintaining bounties in all parts of an animal's range for any length of time; (c) impossibility of maintaining equal rates in all States; (d) impossibility of preventing payments for animals imported from other States, for counterfeit scalps, or for animals raised especially for the bounty. These objections have never been satisfactorily overcome, and most laws have failed through one or another of these causes.

(5) Bounties have not resulted in the extermination of a single species in the United States, and have failed even in the island of Bermuda, which has an area of less than 20 square miles.

(6) Rewards for wolves, coyotes, and panthers are now so generally paid as to check the increase of these species to some extent, but premiums on ground squirrels, gophers, and other small mammals have accomplished little or nothing, and bounties on birds may do great harm by encouraging the killing of useful species through ignorance.

(7) Extermination of noxious animals is usually slow and can be accomplished more effectively and economically through the efforts



of individual land owners than by the lavish expenditure of public funds. [Extract from an article in the Yearbook of the U. S. Department of Agriculture for 1896.]

### "Scalp Bounties."

Readers of our Bulletins have observed that we have adopted the plan of publishing extracts from good articles by reliable writers. By this method we are often able to use articles that are prepared with greater care and accuracy than we should have time to give them under the present rush of duties in the office of the Zoologist.

Among other excellent articles that have come under our attention is the following, entitled "Scalp Bounties," which appeared as an editorial in the *Morning Tribune* of Altoona for March 10, 1904:

"The county once had an experience in the matter of paying bounties on scalps that is probably familiar to the members of the present board of county commissioners, even if the younger generation has not been informed concerning it. The suggestion that it is contrary to the State Constitution to pay out the people's money for the scalps of wild animals and predatory birds is an excellent idea. It promotes the public good by saving money and it suggests to those interested in the protection of their chickens and other domestic fowls the propriety of taking proper precautions against midnight raids.

"It may seem a pity to the reflecting mind that all life is a sort of unremitting warfare. The divine mind seems to have blundered, according to the theory of the critics, when it created birds and beats with predatory instincts or when it gave man an appetite for the flesh of fowl or animal or fish. Nevertheless one must take the world-as he finds it; and one of the things which confronts him upon the very threshold of his career, is the apparent necessity that one creature shall die to provide food for another. If all men and all animals were vegetarians perhaps the problem might be solved, but the chances are that then over-population would be followed by famine.

"The predatory animals, then, are a part of the divine plan. They are entitled to a living, just as man is. They have their place in the scheme of life. They are neither useless, nor unnecessary, as some who are wise above what is written would have us believe. They are a part of the creation which on that far off day was pronounced good, and it is the height of absurdity to compare a self-respecting animal or bird, in search of its heaven-intended food to a common

human thief. There is no comparison between the two. The wild thing has no other way of providing for its needs; the thief could secure abundance if he were willing to engage in honest labor. Yet one of the Tribune's correspondents actually believes that a wild animal which takes advantage of his carelessness and feeds upon his fowls is as bad as the human thief who breaks into his chicken house and appropriates its contents!

"Aside from the divine right of all predatory animals to live, the Tribune does not believe it wise or judicious for the State to provide for paying men a premium for taking care of their own. If eternal vigilance is the price of security in the city the same rule should apply in the country. If one is not public-spirited enough to provide for the safety of his flocks and herds by night he should not expect the county or the State to recompense him for the result of his own carelessness. And no matter what he expects, the State should not assume such a paternal role. In other years many thousands of dollars have been taken from the pockets of the taxpayers to pay for scalps and the thing grew into an intolerable and fraudulent abuse. The State and the county have had enough of it."

Keep on Editor Schwartz, write more while the inspiration is upon you. The above article exactly expresses our views in every detail, and will certainly meet the approval of every educated man, naturalist, and thinking citizen. It should be read in every school with Senator Hoar's famous Bird Petition, and should be placed in the hands of every legislator of the United States. There is no doubt of its accuracy, and we take great pleasure in giving it the prominence it deserves.

ECONOMIC ZOOLOGIST.



## GENERAL REMARKS UPON THE HAWKS AND OWLS.

Owing to the fact that the Hawks and Owls are predaceous birds and are not fully understood or appreciated, and also to the fact that at almost every session of the Legislature some misguided but well-meaning individual introduces a bill designed to pay a bounty upon these very useful creatures, we have found it advisable to discuss them in greater detail than has been given to the birds of other orders. This discussion should prove of interest and value to our Commonwealth, and should not only aid our farmers and fruit-growers to understand what creatures are beneficial and to preserve them, and to know which may at times become obnoxious, and how to destroy them when it is found to be necessary, but it should also be a guide to ambitious legislators who endeavor to serve their country by acting upon the suggestions of some of their constituents who may have but a very imperfect knowledge of the real part which these raptorial creatures play in the scheme of Nature.

The study of these birds in Pennsylvania is certainly of very great value. We are receiving almost every day letters from farmers and fruit growers complaining that the mice and rabbits have injured or destroyed their trees, that the rats are seriously infesting their premises, that the woodchucks, field mice and other rodents are destroying their field crops, and that the English sparrows are increasing in numbers and destructiveness. Practical men are asking for relief from this condition of affairs, and we wish to assure our readers that the primary basis of such relief from mice is to protect their natural enemies. We should gladly publish a list of the persons who have suffered from such injury in order to convince persons who may hold views opposing those here expressed, but there is a natural modesty on the part of our correspondents which we respect, and as some of them prefer to have their names and addresses withheld from publication we do so. However, this list of the persons who have suffered such injury is among our records in the office of the Zoologist, and all persons wishing to see it are invited to call and examine it for themselves. We further request all other citizens in this State who have suffered ravages from these sources to let us know what injury they have experienced, and to what extent

in value of destroyed property. Such records should be made and kept in order to preserve them for use in both practical and legislative work on these important subjects.

The results of our own studies of the stomachs of Owls alone during the past two months will prove of considerable interest, because these are specimens that were collected within the State of Pennsylvania this year. They are as follows:

### The Long-eared Owl:

Speciment No. 1217 contained two voles or meadow mice (*Microtus pennsylvanicus*).

Specimen No. 1219 contained a mouse, species undetermined.

### Barred Owl:

Specimen No. 1222 contained a shrew (Genus *Sorex*).

Specimen No. 1224 contained another shrew (Genus *Blarina*).

Specimen No. 1421 contained a vole or meadow mouse (*Microtus pennsylvanicus*).

### Screech Owl:

Specimen No. 1223 contained a vole (*Microtus pennsylvanicus*), and a red squirrel (*Sciurus hudsonicus*).

Specimen No. 1225 contained a sparrow, species undetermined.

Specimen No. 1368 contained a house mouse (*Mus musculus*).

Specimen No. 1393 contained an English Sparrow (*Passer domesticus*).

### Great Horned Owl:

Specimen No. 1248 contained a mouse, species undetermined.

Specimen No. 1388 contained a rabbit (*Lepus sylvaticus*).

The above record shows that in our own State these birds are engaged in the suppression of obnoxious creatures. Not one beneficial bird or mammal was determined among their stomach contents, while all that were in a sufficient state of preservation to be determined specifically with accuracy were species that were injurious to the agriculturist. While such birds should be preserved, we know that they are not, and since gunners and others continue to shoot the Hawks and Owls, we would urgently request all persons who can obtain such specimens for us to make a special effort to send them to us at Harrisburg by express at our expense, in order that we may both preserve them, and study their food as shown by their stomach contents. This is a permanent invitation for the entire year.



Our remarks upon the value of the Owls are verified in a recent Bulletin entitled "The Birds of Wyoming," by Prof. W. C. Knight. From this we take the following:

"Owls, taken as a whole, are very desirable birds and should not be molested. They usually feed upon rodents and the insects that are enemies to the stockman and farmer alike and seldom prey upon birds of any kind. Unfortunately the average hunter shoots these birds upon sight without provocation, just to see them die. For after looking at a specimen he always throws it aside and probably never considers that he has taken from a community a bird that was of greater benefit as mouser than any cat in the settlement. By all means protect these birds, and try and encourage their living about your homes, and you will not be overrun with mice, which create such havoc about Wyoming ranches." (From Bulletin No. 55 of the Wyoming Agricultural Experiment Station, Laramie, Wyoming.)

## SENATOR HOAR'S FAMOUS BIRD PETITION.

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Probably the most remarkable legal document on bird protection that the world has ever known is the famous Bird Petition by Senator George F. Hoar, Senior Senator from Massachusetts. When this was presented in the Massachusetts State Legislature, the enthusiasm that it aroused was so great that it passed through both Houses like a whirlwind.

This famous petition should be read in every school and home in the country, and we have therefore written to the Secretary of the Audubon Society of Massachusetts especially requesting this copy, that we could here reprint it for the sake of both our birds and our people. It will never grow old, and should be read by every person at least once every ten years:

To the Great and General Court of the Commonwealth of Massachusetts, We, the song-birds of Massachusetts and their playfellows, make this our humble petition:

We know more about you than you think we do. We know how good you are. We have hopped about the roofs and looked in at the windows of the houses you have built for poor and sick and hungry people and little lame and deaf and blind children. We have built our nests in the trees and sung many a song as we flew about the gardens and parks you have made so beautiful for your own children, especially your poor children, to play in.

Every year we fly a great way over the country, keeping all the time where the sun is bright and warm; and we know that whenever you do anything, other people all over the great land between the seas and the great lakes find it out, and pretty soon will try to do the same thing. We know; we know. We are Americans just as you are. Some of us, like some of you, came from across the great sea, but most of the birds like us have lived here a long while; and birds like us welcomed your fathers when they came here many years ago. Our fathers and mothers have always done their best to please your fathers and mothers.

Now we have a sad story to tell you. Thoughtless or bad people are trying to destroy us. They kill us because our feathers are beau-



tiful. Even pretty and sweet girls, who we should think would be our best friends, kill our brothers and children so that they may wear their plumage on their hats. Sometimes people kill us from mere wantonness. Cruel boys destroy our nests and steal our eggs and our young ones. People with guns and snares lie in wait to kill us, as if the place for a bird were not in the sky, alive, but in a shop window or under a glass case. If this goes on much longer, all your song birds will be gone. Already, we are told, in some other countries that used to be full of birds, they are almost gone. Even the nightingales are being all killed in Italy.

Now we humbly pray that you will stop all this, and will save us from this sad fate. You have already made a law that no one shall kill a harmless song bird or destroy our nests or our eggs. Will you please to make another that no one shall wear our feathers, so that no one will kill us to get them? We want them all ourselves. Your pretty girls are pretty enough without them. We are told that it is as easy for you to do it as for Blackbird to whistle.

If you will, we know how to pay you a hundred times over. We will teach your children to keep themselves clean and neat. We will show them how to live together in peace and love and to agree as we do in our nests. We will build pretty houses which you will like to see. We will play about your gardens and flower beds—ourselves like flowers on wings—without any cost to you. We will destroy the wicked insects and worms that spoil your cherries and currants and plums and apples and roses. We will give you our best songs and make the spring more beautiful and the summer sweeter to you. Every June morning when you go out into the field, Oriole and Blackbird and Bobolink will fly after you and make the day more delightful to you; and when you go home tired at sundown, Vesper Sparrow will tell you how grateful we are. When you sit on your porch after dark, Fife Bird and Hermit Thrush and Wood Thrush will sing to you; and even Whip-poor-will will cheer up a little. We know where we are safe. In a little while all the birds will come to live in Massachusetts again, and everybody who loves music will like to make a summer home with you.



**End of  
Volume**